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ABSTRACT

A study described the instructional practices and perceptions of K-8 keyboarding instructors in Pennsylvania public schools regarding keyboarding practices. Surveys were sent to 501 school districts, with responses from 416 (83 percent). The surveys contained 19 questions that provided descriptive information about instructional practices and 17 statements that measured teachers' perceptions. Of the 282 teacher respondents, 121 had business education certification. Analysis of the data revealed that school districts in Pennsylvania introduced keyboarding at all presecondary grade levels; the majority of instructors have between 1 and 5 years experience teaching K-8 level keyboarding. Only six of the respondents without business education certification received formal training in their teacher preparation programs to teach keyboarding; however, nearly all of the teachers have prepared themselves through formal or informal means to teach keyboarding. Almost 79 percent use computer software programs for instructional purposes. Class sessions usually last from 36 to 45 minutes; however, the number of class sessions varies widely. Slightly more than one-half of the school districts have a formal plan for developing keyboarding skills through the presecondary grades. Recommendations were made for keyboarding teacher training and computer keyboarding development programs. (The report contains 50 references and 9 appendixes of project documents and the survey instrument.) (Author/KC)

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The Pennsylvania State University
The Graduate School
Intercollege Program in Vocational Education

INSTRUCTIONAL PRACTICES AND PERCEPTIONS
REGARDING PRE-SECONDARY KEYBOARDING
IN PENNSYLVANIA PUBLIC SCHOOLS

A Thesis in
Vocational Education

by
John D. Cantalupi

Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Doctor of Education

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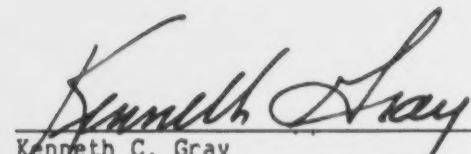
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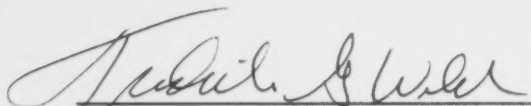
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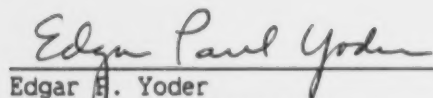
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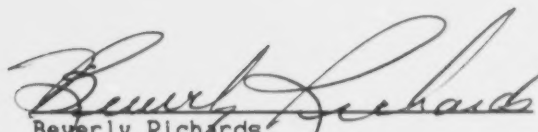
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ABSTRACT

The general purpose of this study was to describe the instructional practices and perceptions of pre-secondary (K-8) keyboarding instructors in the public schools of Pennsylvania, and to determine if there were any relationships between perceptions of business education certified teachers and non-business education certified teachers regarding keyboarding instructional practices and issues. A survey instrument was sent to the superintendent for each of Pennsylvania's 501 public schools requesting him/her to have a teacher responsible for teaching a formal introductory keyboarding experience at the pre-secondary level complete the survey. The survey contained 19 questions that provided descriptive information about instructional practices and 17 statements that measured teachers' perceptions.

A total of 416 (83.0%) school district personnel responded to the survey. Representatives from 282 school districts (67.8%) indicated they currently offer a pre-secondary keyboarding program. Of the 282 teacher respondents, 121 were business education certified and 161 were non-business education certified. SPSS-X was the data analysis program used to analyze data. The primary data analysis statistics involved the descriptive statistics: mean, percentages, and correlations, namely chi-square and Cramer's V.

Analysis of the data revealed school districts in Pennsylvania introduced keyboarding at all pre-secondary grade levels, and the majority of instructors (77.0%) have between one and five years

experience teaching pre-secondary keyboarding. Only six (3.7%) of the non-business education certified respondents received formal training to teach keyboarding in their teacher preparation program; however, nearly all of them (99.4%) have prepared themselves through formal or informal means to instruct keyboarding. Forming good keyboarding habits was the objective of most respondents (78.0%). Almost four-fifths (79.4%) of the respondents use computer software programs for instructional purposes. Class sessions usually last from 36 to 45 minutes; however, the number of class sessions devoted to introducing keyboard keys varies widely. When evaluation is used, it is most often based on technique. Slightly over one-half (52.8%) of the school districts have a formal plan for developing keyboarding skills through the pre-secondary grades.

In light of this study, it is recommended that local school districts assure that keyboarding instructors possess the skills and abilities related to this responsibility; teacher training institutions provide formal training for future teachers in using computer technology (to include a methods unit in teaching keyboarding); local school districts and universities collaborate to provide instructional workshops for individuals currently teaching keyboarding; and, school administrators, business education certified teachers and non-business education certified teachers work cooperatively in developing/maintaining effective keyboarding programs.

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Chapter 1

INTRODUCTION

The number of computers in our nation's schools is escalating at a staggering pace. Kimball and Lane (1989) estimated that "by the 1990s there will be over ten million computers in public schools" (p. 70). According to Sormunen, Adams, Berg, and Prigge (1989), 95% of the public schools in our nation are now equipped with computers. In other words, school personnel have access to computers in various capacities which include computer laboratories, computers for tutorial purposes, and varied numbers of computers to be utilized in individual classrooms.

The computer surfaced on the educational scene in the early 1980s and school personnel were quick to realize the potential benefits of this educational tool. Initially the computer appeared at the secondary school level where it was utilized in mathematics departments for the teaching of computer programming and in business education departments for word processing applications. Gradually the computer found its way to the junior high/middle school, and most recently it has made its presence felt in elementary schools. Behymer and Echternacht (1987) reported that in 1984-85, 82.2% of the elementary schools in the United States were using computers for various instructional purposes.

The National Commission on Excellence in Education (1983) in the report, "A Nation at Risk," recommended to states that high school graduation requirements be strengthened. In addition to the required

academic areas of English, mathematics, science, and social studies, the Commission recommended that students complete one-half year of computer science. The justification was that we are in the information era, and graduates must be able to efficiently use the computer technology associated with this information era.

Basic to the efficient use of a computer is the ability to enter data rapidly. The primary device for inputting data into the computer is a typewriter-like device called a keyboard. Computer keyboards differ from typewriters in that they include, in most cases, function keys and numeric keypads. How a person learns to use the keyboard then is of primary importance.

Communicating most effectively with the computer via the keyboard is typically accomplished by using the touch method of typing. Sormunen et al. (1989) defined touch typing as having all eight fingers positioned on the home row keys (asdfjkl;) and activating all other keys by using the proper finger and reach from the home row with little need to look at the keyboard. Buckley (1988) encouraged school personnel to insist students master touch typing. Wetzel (1985) stated that "Students who have adequate keyboarding skills use their time at the computer efficiently--that is, they can concentrate on problem solving or composing, rather than on the mechanics of typing" (p. 15). Rhodes (1985) reported that the lack of entry speed greatly reduces the computer's phenomenal capabilities. Attempting to operate a microcomputer without keyboarding skills is akin to being called upon to operate an automobile without driving skills!" (p. 2).

The Policies Commission for Business and Economic Education (1984b) issued a position statement recommending that with the rapid expansion of computer usage, educational institutions should require all students to develop keyboarding skills. The Commission members stated that, "Keyboarding skills will allow students to interface more efficiently with microcomputers in educational, personal, and/or future employment settings" (p. 57).

Keyboarding and typewriting are not the same. Rhodes (1987) distinguished between keyboarding and typewriting noting that, "Keyboarding includes all data entry operations, while typing is singularly concerned with hard copy formatting" (p. 19). More simply, the author described keyboarding as a mechanical skill which entails feeding data into a system and typewriting as a more conceptual understanding of documents such as letters, memorandums, resumes, etc.

A sound fundamental background in keyboarding is essential no matter what career one chooses in today's information-oriented, highly technological society. Binderup (1988) stressed the importance of the keyboarding skill by stating, "Keyboarding is an invaluable skill that forms the foundation for lifelong, efficient computer use" (p. 31). O'Neil (1989) estimated that 75% of the workers in the United States use the computer on a daily basis. Loughran (1986) noted that with computers infiltrating the home, schools, and the workplace, "our society has definitely arrived at a point where touch keyboarding skill has become a basic need" (p. 22). Kimball and Lane (1989) suggested that, "The educational basics of today are reading, writing, arithmetic, and keyboarding" (p. 76).

Need for the Study

Every year more states are mandating instructional use of computers, including keyboarding, in schools. Currently, Pennsylvania does not have such a mandate; however, a resolution was passed by the state legislature recommending keyboarding instruction in the sixth grade (Christen & Gladstone, 1983). The Pennsylvania Business Education Association (1990), which represents business teachers at the secondary and postsecondary level in Pennsylvania, submitted a position paper to the State Board of Education recommending the addition of a required, planned keyboarding course for all elementary students. The primary reason for this recommendation was that, "computer usage is increasingly being integrated into the major content areas of mathematics, science, reading, and language arts, as well as relatively new instructional areas such as computer literacy, computer programming and graphics, and word processing" (p. 2).

The need for keyboarding instruction at the pre-secondary level has created massive confusion among educators (Sowers, 1989). Through personal conversations, administrators and teachers in numerous school districts indicated that little similarity exists in the content and instructional practices used in keyboarding courses which are being implemented at the pre-secondary level. Keyboarding at the pre-secondary level was being taught by certified business educators as well as non-business education certified teachers. In their national survey of elementary and junior high/middle school keyboarding instructors, Kimball and Lane (1989) found keyboarding being taught by

individuals with college majors in special education, art, physics, music, natural sciences, French, biology, Latin, social studies, English, mathematics, library science, administration, and counseling.

It is not uncommon to find keyboarding courses being taught in the early elementary grades in some schools and in the junior high/middle school grades in other schools. Brady (1984) reported that keyboarding is being taught at all grade levels, and it is being taught by teachers who have little sense of what to expect from young children who study keyboarding. O'Neil (1989) agreed by stating, "Local policies on whether keyboarding is required of all students vary, as do policies on when such training should start and who is qualified to provide it" (p. 6). Since no state mandate exists in Pennsylvania regarding keyboarding, instruction is being implemented at various grade levels.

An awareness of instructional issues related to keyboarding is imperative if schools are to make more informed decisions concerning the initiation of keyboarding at the pre-secondary level. Wetzel (1985) summarized the feelings of educators at all levels by stating, "Keyboarding is too important to leave to chance" (p. 6).

Purpose of the Study

The general purpose of this study was to describe the status of keyboarding instruction at the pre-secondary level in the public schools of Pennsylvania. The study focused on three major research questions:

1. What are the instructional practices of pre-secondary keyboarding instruction regarding:
 - a. grade level where keyboarding is being taught?
 - b. years of pre-secondary keyboarding teaching experience of instructors?
 - c. certification areas of pre-secondary keyboarding teachers?
 - d. number of pre-secondary keyboarding instructors receiving formal preparation through teacher education institutions?
 - e. formal and informal methods of preparation used by teachers who teach pre-secondary keyboarding?
 - f. objectives of pre-secondary keyboarding programs?
 - g. kinds of equipment used to teach pre-secondary keyboarding?
 - h. teachers' knowledge about and personal use of the touch method of keyboarding?
 - i. instructional methods used for teaching pre-secondary keyboarding?
 - j. instructional materials used to teach pre-secondary keyboarding?
 - k. amount of time devoted to introducing keyboard keys?
 - l. student evaluation approaches used to assess keyboarding performance?

- m. sequential offerings within the school district for continuous application of keyboarding skills?
2. What are the perceptions of pre-secondary keyboarding teachers regarding the:
- a. appropriateness of keyboarding in the pre-secondary curriculum?
 - b. value of developing keyboarding skills?
 - c. qualifications of instructors providing keyboarding instruction?
3. Do the perceptions of pre-secondary keyboarding teachers differ based on their area of certification regarding the:
- a. appropriateness of keyboarding in the pre-secondary curriculum?
 - b. the value of developing keyboarding skills?
 - c. the qualifications of instructors providing keyboarding instruction?

Answers to the aforementioned research questions provided a basis for attaining the study goals which were to provide information to:

- 1. local school district personnel which may be useful in the development of pre-secondary curricula;
- 2. pre-secondary keyboarding teachers relative to current practices and procedures in keyboarding; and

3. the Pennsylvania Department of Education and to teacher training institutions that will be useful for teacher certification and preparation purposes.

Limitations of the Study

This study was limited by the fact that:

1. the superintendent for each school district was responsible for forwarding the cover letter and survey instrument to the individual in his/her school district who taught any formal introductory keyboarding experience; and
2. only one individual responsible for teaching pre-secondary keyboarding participated in the study from each school district that offered a pre-secondary keyboarding experience.

Definitions

Business Education Certified Teacher--An individual who has completed a business education teacher program at an accredited college or university and procured the proper state certification.

Computer Literate--The ability of an individual to understand the computer's capabilities and limitations. The person should also demonstrate a fundamental knowledge of computers and their effects on society. A computer literate person is able to communicate with others using computer vocabulary, operate a computer effectively, access information in a computer, input information with speed and

accuracy using keyboarding skills, and use the computer as a tool for solving problems (Policies Commission for Business and Economic Education, 1984a).

Grade Level--This refers to the grade or class in which the student is enrolled and is further classified as:

Pre-secondary Level--Grades K through 8.

Junior High/Middle School Level--Grades 6 through 8.

Secondary Level--Grades 9 through 12.

Hunt and Peck--A slow and tedious method of typing that many students use when they operate computers (Hopping, 1984).

Keyboarding--The act of placing information into various types of equipment through the use of a typewriter-like keyboard (Policies Commission for Business and Economic Education, 1984b).

Microcomputer--The name given to a small, low cost computer system with a microprocessor as its brain. A microcomputer can perform input, processing, storage and retrieval, and output operations rapidly, accurately, automatically, and economically despite its relatively small physical size (Robichaud, Muscat, & Hall, 1989). The term "computer" shall be used interchangeably with "microcomputer."

Non-Business Education Certified Teacher--An individual not completing a business education teacher program at an accredited college or university or possessing state business education

certification. For this study, non-certified business education teachers may include teachers who possess college degrees in areas such as: special education, art, physics, music, sciences, foreign languages, English, social studies, mathematics, etc.

Non-Teacher Directed Instruction (computer-assisted)--A format of instruction using software that is compatible with a computer. This is a self-tutorial style which needs to be monitored for steady progress of the students (Robinson, 1985).

Teacher Directed Instruction (traditional)--The traditional class consists of an instructor who guides the learning and pacing of students through drills during each class period, with all students at the same point in the textbook. Practice may be implemented on typewriters or microcomputers (Robinson, 1985).

Touch Typing--The act of having eight fingers positioned on the home row keys (asdfjkl;) and activating all other keys by using the proper finger and reach from the homerow with little need to look at the keyboard (Sormunen et al., 1989).

Typewriting--The continued development of keying skills and the use of those skills to produce output in a variety of applications, such as in the creation of letters, memoranda and reports (Jackson & Berg, 1986).

Chapter 2

REVIEW OF THE LITERATURE

The purpose of the study was to describe the status of keyboarding instruction at the pre-secondary level in the public schools of Pennsylvania. Chapter 2 includes a review of literature related to the following topics: grade level, certification, teacher education, formal and informal preparation, keyboarding objectives, equipment, touch typing, method of instruction, instructional materials, length of instruction, evaluation, and sequential exposure to instruction. These topics represented the major variables investigated in the study.

Grade Level

Research showed varied opinions as to the preferred grade level for introduction of keyboarding instruction. Studies were conducted with students, as early as the kindergarten level, to determine whether they possess the ability to keyboard. In a summer school program involving students in grades K-2, Kaser (1984) found that young children can learn to type 8-15 words per minute, but suggested, "Their attention span is too short for proper learning of the keyboard, and their hand size and level of finger dexterity are drawbacks" (p. 16). In a microcomputer keyboarding program in the Fort Knox Community School District, Kentucky, 500 first grade students typed in the range of 4-7 words per minute after receiving 40 minutes of instruction per week for one semester (Palmer, 1989).

Jackson and Berg (1986) suggested that perhaps the goal of keyboarding instruction at this early age, K-2, should simply be the familiarization with the keyboard.

Literature also indicated that a clear distinction exists between the achievement level of second and third graders. The difference between the two levels was highlighted in the study conducted by Kaser (1984). He reported that second graders were typing 8-15 words per minute and third graders were typing 15-25 words per minute after a six-week, 55 minute-per-day summer session. As a result of the study, Kaser recommended that third graders not be placed with second graders because second graders hinder the progress of third graders. Similarly, Behymer and Echternacht (1987), reported that third graders were able to key at a significantly higher speed than second graders after four days a week for three weeks with 30-minute class sessions.

In a national survey conducted by Kimball and Lane (1989), the authors reported that respondents felt students at the third grade level were physiologically ready to learn keyboarding because they had longer attention spans, better dexterity, and a greater maturity. Their study involved a random sampling of one elementary and middle/junior high school instructor in each of the 50 states. Fifty percent of the instructors surveyed responded to their questionnaire.

In a national study of public school administrators concerning their perceptions about elementary school keyboarding, Condon, Hoggatt, and Weston (1989) reported that 50% of the administrators felt third graders could learn the skill of keyboarding. In a study measuring the keyboarding achievement level of students in grades 3,

4, 5, and 6, Sormunen (1988) concluded, "there is no one grade level that is the most effective time to teach keyboarding" (p. 55).

Although research indicated that keyboarding can be successfully introduced at the third grade level, Headley (1983) suggested from her own experiences that the local program should dictate the time frame and grade level for teaching keyboarding. The Policies Commission for Business and Economic Education (1984), which consists of 12 appointed members representing three major professional business education organizations, was founded in 1959 with the purpose of identifying and defining both existing and emerging issues in business and economic education. The Commission recommended that students develop keyboarding skills just prior to the time they apply the skills. The application of keyboarding skills would differ from one school district to another based upon curricular philosophies/ mandates.

Certification

Teacher certification is required in every state's public schools for grades K-12. In an effort to standardize existing teacher preparation and certification programs, the National Education Association created the National Commission on Teacher Education and Professional Standards. Two goals of the Commission were the establishment and dissemination of professional standards regarding prospective teachers and certification (Huggett & Sinnett, 1956). The National Council for Accreditation of Teacher Education (1987) statement of policy relating to certification is as follows:

Certification is the legal authorization for a person to teach in the public schools. Certification regulations and policies, properly formulated and applied, contribute to the achievement of satisfactory professional standards. Certification, accreditation, and teacher education constitute a continuing process designed to assure an adequate supply of competent persons for teaching.

1. Broad legal powers for the formulation and application of certification requirements should be vested in the chief state education agency and its appropriate professional staff or division. Because of the technical nature of the problem and the changing demands of education and teaching, the prescribing of regulations by statute is impractical.
2. In exercising these broad powers, the chief state education agency should formulate rules, regulations, and policies through cooperative processes involving the participation of the profession and the public.
3. Certificates representing different levels of professional preparation should be issued upon completion of programs in institutions accredited specifically for teacher education, as follows: (a) the baccalaureate degree with four years of preparation for teaching for initial or probationary certification at all levels; (b) five years of college preparation, together with appropriate teaching experience, for continuing teacher certification; (c) five years of college preparation, together with appropriate teaching experience, for initial certification of administrative, consultative or supervisory, and special school service personnel; (d) six years of college preparation, together with appropriate experience, for continuing certification of administrative, consultative or supervisory, and special school service personnel. It is recognized that for certain vocational and auxiliary fields the above standards may not be immediately applicable. Otherwise, state requirements below these minima should be up-graded rapidly, with state deadlines fixed for the time of their achievement.
4. Certification rules, regulations, and policies should facilitate the free flow of qualified teachers, as defined above, across state lines. (p. 397)

Keyboarding certification, a controversial issue in the teaching of pre-secondary keyboarding, has become a territorial issue in recent years. Loughran (1986) commented that, "Without a doubt, business educators should teach keyboarding" (p. 22). Conversely, Wetzel

(1985) suggested that regular classroom teachers should instruct elementary keyboarding based on a premise that they can be as effective as business educators.

The Pennsylvania Certification Manual (Pennsylvania Department of Education, 1987) documented that there is no existing certification created specifically for instruction in the broad field of computer education, to include keyboarding, nor is the teaching of computer education courses reserved to any specific certificate. The Manual further documented that:

Considering the recent and rapid emergence of computer education and the best interests of quality education, it is recommended that a teacher certified in a traditional subject, who has not yet had an opportunity to attain a background in computer education, not be assigned until he/she has an opportunity to do so. (p. 3)

The school entity has the prerogative to establish a specific prerequisite certificate as well as special training, education, experience, skills or abilities which a person in this position must possess to perform the assigned responsibilities (Shuster, personal communication, 1991).

In an effort to deal with keyboarding certification in Pennsylvania, a committee was formed by the Pennsylvania Business Education Association in 1984 to review all areas of business education teacher certification. According to Klemkowsky (personal communication, 1990), a member of the committee, one identified need was to provide for certified personnel to teach keyboarding in the elementary school. In 1985, the committee submitted a report to the subcommittee of the Professional Standards and Practices Commission

requesting that business education teachers be certified K-12 so they might be the sole group certified to teach keyboarding. The request was denied by the Commission because it was too self-serving.

In 1987, the committee once again reorganized with the goal of addressing keyboarding at the elementary school level and the teacher's keyboarding certification. After extensive preparation, the committee submitted a request to the Secretary of Education. The results were the same; the request was denied. It was the opinion of the committee members that the Bureau of Teacher Preparation and Certification did not want to add any new certification requirements for business education teachers. The committee believes that the issue will not be renewed until 1994 when all areas of certification will be reviewed (Klemkosky, personal communication, 1990).

Morrison (1986) offered support for certified business educators being solely responsible for pre-secondary keyboarding instruction. In a graduate course designed to prepare business teachers to teach keyboarding to elementary school children at Robert Morris College in Coraopolis, Pennsylvania, a recommendation by the participants at the conclusion of the course was:

Keyboarding should be taught by business teachers who are trained to develop proper techniques and teach a psychomotor skill. Business teachers can provide the needed guidance to correct bad habits, diagnose problems, and prescribe remedial training. (p. 27)

Teacher Education

With the influx of computers in the information age, pre-service teacher education programs should develop teachers who are trained in

these areas (Kimball & Lane, 1989). However, teacher education institutions are providing little, if any, education in the areas of computer literacy and methods for teaching keyboarding. Fulton (1988) reported from the results of a national study conducted by the House Committee on Education and Labor that "Half the states currently neither require nor recommend (computer) technology preparation for new teachers" (p. 34). Further, he suggested that an effective way of making computer skills part of teacher preparation is to integrate "the use of technology in subject matter methods courses" (p. 34). Molnar (1978-79) suggested that a college education is not complete unless one has been exposed to computers.

Formal and Informal Preparation

The purpose of formal and informal preparation to teach keyboarding is to adequately prepare oneself to assume the responsibilities of this assignment. A significant finding in the Kimball and Lane (1989) national survey of pre-secondary keyboarding instructors was that 28% of the respondents had no formal or informal training to teach keyboarding.

Sormunen et al. (1989) listed several formal and informal approaches for teachers to prepare for keyboarding instruction. Suggested methods of formal preparation might include enrolling in: keyboarding/typewriting, methods of instruction, and word processing courses. Rhodes (1987) reported that the pre-secondary keyboarding instructor should:

have received teacher training in the traits, needs, interests, etc. of the student age group with whom he/she will be dealing. The instructor should have a minimal degree of computer awareness through personal usage of this technology. Finally, it is desirable that the instructor have a functional touch keyboarding skill. (p. 21)

Informal methods recommended to prepare oneself to teach keyboarding might include: Independent study/reading, assistance from other pre-secondary teachers who are currently teaching keyboarding, help from business education teachers, attendance at workshops, inservice training, etc.

Based on a survey conducted by Concialdi (1985) in the suburban Chicago Cook County area involving 36 principals and 42 keyboarding instructors, inservice training sessions (one method of informal preparation) appeared to be the most appropriate means of education for currently employed elementary keyboarding instructors. From her study of first grade students reported earlier, Palmer (1989) recommended that inservice sessions be conducted in cooperation with business educators because they generally are certified at the secondary level to instruct typewriting. If practical, Diehl (1986) suggested that elementary keyboarding instructors be given an hour of released time daily for two weeks to observe the psychology and appropriate methods utilized by experienced business educators to introduce the keyboard. Her suggestion resulted after 22 students with above average intelligence completed a three week, 30-minutes per day course instructed by an elementary media specialist. Regardless of the inservice program utilized for the preparation of pre-secondary keyboarding instructors, Williams (1988) emphasized that the program

should "be of sufficient length to assure thorough preparation" (p. 28). Her recommendation came after she attended a week-long summer session at the University of Wisconsin-Superior. During the week, daily sessions for two hours plus one laboratory hour, were held. The teachers in the session observed and participated in a microteaching experience that involved elementary students.

Regardless of the type of formal or informal preparation, the individual should be knowledgeable about the touch method of typewriting and should possess the ability to operate a computer. The overall success of any pre-secondary keyboarding program depends upon the quality of instruction.

Keyboarding Objectives

The primary objective of any pre-secondary keyboarding course should be the development of proper techniques (Kimball & Lane, 1989). A solid background in rudimentary keyboarding will enable students to form proper habits and make efficient use of computers. Dennee (1989), based on a course she developed from a professional literature search, and Jackson and Berg (1986), based on ongoing keyboarding programs in their state, stressed that the major emphasis should be on correct body and hand positioning plus correct keystroking technique using the touch method.

Traditional keyboarding/typewriting programs at the secondary level have placed a heavy emphasis on attaining pre-determined speed and accuracy levels for both personal and/or vocational use. Sowers (1989), felt that all keyboarding students, regardless of grade level,

will not develop a usable skill if speed proficiency is not stressed. Boyce (1988) indicated that elementary students should be able to key at least 20 to 25 words per minute if a six- to nine-week, 30-minute-per-day block unit of keyboarding instruction was utilized.

Finally, the Policies Commission on Business and Economic Education (1984b) identified the following instructional objectives that students should be able to meet after 25 to 45 hours of instruction in keyboarding:

1. Demonstrate the correct "touch" method for operating alphanumeric keys.
2. Demonstrate the correct "touch" method for operating a ten-key numerical pad.
3. Demonstrate a straight-copy speed of 25 to 40 words per minute (2.5 to 4 lines per minute) on 1-and 2-minute timed input exercises. Errors should be unacceptable since electronic corrections are part of the "touch" method on an electronic keyboard.
4. Demonstrate the ability to work from straight-copy and rough-draft material.
5. Demonstrate the ability to proofread both alphabetic and numeric data.
6. Demonstrate the ability to follow oral and written directions.
7. Demonstrate the ability to compose at the keyboard.
(p. 57)

Equipment

Keyboarding instruction can be offered using computers, electronic typewriters, electric typewriters, or manual typewriters. Based on a summer program that met for 19 days, 20 minutes per day, involving 24 five-through-eight-year-old boys and girls, Hedley (1985)

suggested that keyboarding instruction can be taught on either electric typewriters, electronic typewriters, and/or computers, and that it would not be a complicated process to transfer keyboarding skills from one standard keyboard to another. Rhodes (1987), however, disagreed by stating, "a typewriter is not a computer and cannot support truly effective keyboarding instruction" because it does not include a keypad, function keys, and cursor movers and it does not interact with a student in the mode of a computer program (p. 19). Jackson and Berg (1986) shared the opinion of many keyboarding instructors in that manual typewriters are obsolete and instruction with this type of equipment is inappropriate.

In reference to the current status of keyboarding equipment, Kimball and Lane (1989) found that 51% of the pre-secondary keyboarding instructors they surveyed were teaching keyboarding solely on computers. Twenty-eight percent were using typewriters and 21% were using a combination of computers and typewriters.

Touch Typing

There appears to be a consensus in the literature that keyboarding proficiency can be attained best through the use of the touch method of keying/typing. Buckley (1988) encouraged school personnel to teach the mastery of touch typing, which he defined as the ability to turn one's head to the side, read material, and simultaneously type without looking at the keyboard. Hoot (1986) reasoned that, "It would seem reasonable, then, that increased typing facility would contribute to improved computer facility" (p. 95).

The alternative to the touch method of typing is the hunt-and-peck method. Depending on the individual, this method features any combination of fingering patterns. Hopping (1984) commented that "Hunt-and-Peck Isn't a comedy team" (p. 28). There are individuals who become fairly proficient at the hunt-and-peck method and would argue its relative merits. Post (1985) wondered if it is possible to gain competency with this method.

The hunt-and-peck method of typing is generally viewed as incorrect and inefficient. Students allowed to utilize this system during their elementary years often develop high levels of frustration. It is a slow and cumbersome process in which students lack confidence in their abilities, and they are prone to errors due to the constant eye movement from copy to the keyboard (Loughran, 1986). In an informal analysis of students' keying efficiency using the hunt-and-peck method versus the touch method, Jackson and Berg (1986) found that after 15 hours of keyboarding instruction students using the touch method keyed twice as fast as those who used the hunt-and-peck method. On the other hand, "Students who have adequate keyboarding skills use their time at the computer efficiently--that is, they can concentrate on problem solving or composing, rather than on the mechanics of typing" (Wetzel, 1985, p. 15). It is generally agreed (Behymer & Echternacht, 1987; Condon et al., 1989; Frankeberger, 1985; Loughran, 1986) that higher levels of speed are unattainable through the hunt-and-peck method of typing.

Learning the correct form or touch method of typing is extremely difficult for an individual who has learned bad habits. Behymer and

Echternacht (1987) warned that "some bad habits are so reinforced that it can be impossible to break them" (p. 31). Hedley (1985) compared learning keyboarding by the touch method to other skills by stating, "Just think how difficult it is to teach someone who learned to play the piano by ear correct piano technique, or the problems one encounters in trying to change a golf swing after having developed one's own style" (p. 18).

Further, Hedley (1985) reported that keyboarding is a skill that requires correct habits be formed at an early age and perfected with continuous reinforcement activities. These activities would include both guided and independent practice and short and intense periods of practice occurring over long periods of time. Kimball and Lane (1989) summarized the opinions of the majority of researchers and keyboarding instructors by stating:

As students begin using the keyboard, they form lifelong habits where correct techniques are extremely important for efficiency. Being a cumulative skill, keyboarding requires the perfecting of initial techniques upon which further skill can be built. (p. 70)

Simply said, "It is easier to form good habits from the start than to break bad habits once they are formed" (Hoggatt, Mann, & Mastin, 1988, p. 39).

Method of Instruction

The traditional, or structured, method of instruction in keyboarding has been the teacher-directed approach. This approach involves the teacher guiding the learning and pacing the students through drills (Robinson, 1985). With the advent of the computer,

software packages have been developed that allow students to progress at their own pace. This method of instruction is commonly referred to as computer-assisted instruction. The third method of instruction in keyboarding is simply a combination of the teacher-directed and computer-assisted approaches.

Regardless of the method utilized, Robinson (1985) reported that teacher supervision is paramount. Teachers must continually check students to assure that they are applying correct fingering techniques when learning the keyboard. Keyboarding teachers must be actively involved in the teaching-learning process (Alexander & Echternacht, 1990). Kimball and Lane (1989) advised that "students must be monitored constantly and given immediate praise and/or constructive feedback on techniques" (p. 76).

Robinson (1985) recommended that the following elements prevail in the teacher directed method:

1. Modeling--demonstrating frequently each aspect of technique to be learned.
2. Reinforcement--providing frequent feedback regarding results of practice.
3. Individualized goal setting--setting each student's new goal(s) on the basis of her/his own most recent performance, whether the goal be technique, speed, or accuracy improvement.
4. Pacing--leading the students to progressively higher levels of keystroking by setting a pace just beyond their current keystroking levels.
5. Differentiated practice--assuring (after the new-key learning) that what and how various students practice is geared to their individual needs.
6. Evaluation--assessing how nearly each learner is approaching preset goals (for technique, speed, and

accuracy). Techniques can be evaluated only by observation; speed, by timed writing; and accuracy, by checking the papers students produce. Such evaluation should be formative; used only to provide suggestions for better practice methods that will lead to improved performance. (p. 4)

The effectiveness of computer-assisted instruction has yet to be determined. Brady (1984), based on personal conversations she had with elementary keyboarding instructors, warned that teachers lacking experience should not rely on popular software tutorial packages to teach students to type. Robinson (1985) observed that computers do have their limitations. They cannot see; consequently, they cannot monitor student work. They cannot hear; so they cannot answer questions. A knowledgeable, well-trained teacher must supply the missing ingredients. A review of the literature failed to reveal any studies conducted to determine the effectiveness of the computer-assisted method of teaching keyboarding versus the teacher-directed method.

Instructional Materials

Instructional materials used in teaching keyboarding fall into four major categories: computer software programs, publishers' textbooks, teacher created materials, or any combination of the above. According to the survey conducted by Kimball and Lane (1989), 42% of the respondents used computer software for instruction, 37% used publishers' textbooks, 7% created their own materials, and 14% used a combination of computer software and publishers' textbooks.

Each year, more software packages that teach the traditional method of touch typing appear on the market. According to Prigge (1988), the most widely used package was MECC (Minnesota Educational Computer Consortium). Her study was based on 329 survey returns from a stratified random sample of 500 elementary teachers, at various elementary grade levels, in the state of North Dakota. Other popular software packages included: PAWS, Typing Tutor, MicroType, etc. According to an analysis of material by Craighead and Switzer (1983):

software programs fall into two general groups: 1) programs that help young children learn the keyboard while they build other skills such as letter and number recognition, alphabetizing, directional skills, and problem solving; and 2) programs for intermediate and upper elementary students that isolate keyboarding skills as their sole objective. (p. 179)

Jackson and Berg (1986) reported that the newer software packages include instruction for proper technique, paced skill development, speed reports, feedback, games, and an option for open screen keying. Milkes (1987) warned that some software packages are limited in that they include repetitive instruction, overuse of nonsense materials, limited practice materials, complicated exit procedures, and prohibitive costs.

Many new commercial keyboarding/typewriting textbooks have surfaced in recent years. Diehl (1986) suggested that serious consideration be given to utilizing textbooks authored by competent professionals. She adds:

Their textbook materials are so arranged that the psychological principles of teaching a motor skill are implemented in the most efficient manner. Continuity of material based on psychological principles has a dynamic influence on the typist's ability to master the keyboard by touch. (p. 8)

Dennee (1989) and Jackson and Berg (1986) recommended a combination of publishers' textbooks and computer software packages be used as variety of instructional materials raises the interest level of learners, especially young children.

Dennee (1989) offered a comprehensive checklist for selecting textbooks and software packages for keyboarding instruction. The list included:

1. The materials should be appropriate for the maturity and achievement level of the elementary students.
2. The readability index should be for the lowest grade level you are teaching.
3. The type size must be appropriate for the various age differences.
4. Keyboarding drills should be integrated with the language arts concepts.
5. Keyboarding techniques should be emphasized frequently and well illustrated.
6. The drill lines should progress quickly from isolated letters to words, phrases, sentences, and paragraphs.
7. Frequent review lessons should be provided.
8. Objectives and directions for initial instruction and practice should be clearly stated.
9. After learning the home row keys, new keys should be introduced two at a time--one easy and one harder to reach.
10. Frequent assessment of the student's skill development should be provided.
11. Emphasis should be on technique, then on speed, and lastly, on accuracy. (p. 13)

Augustin (1988) and Milkes (1987) both warned that teachers who have little or no experience in teaching keyboarding or working with

computers should expect to spend a considerable amount of time working through textbooks and software packages to familiarize themselves with the strengths and limitations of support materials.

Length of Instruction

Opinions varied on the amount of time that should be devoted to keyboarding instruction. The age and maturity level of elementary students must be considered. According to Dennee (1989), Frankeberger (1985), Headley (1983), Hedley (1985), Jackson and Berg (1986), Kimball and Lane (1989) and Milkes (1987) daily keyboarding lessons should last for 30 minutes at the elementary level while Kimball and Lane (1989) suggested that instruction at the junior high/middle school level last 40-45 minutes. "A general guide might be, the younger the student, the less time should be spent per session due to the shorter attention span" (Dennee, 1989, p. 13). Frankeberger (1985) warned that after one-half hour of instruction, elementary students lose their concentration and the effectiveness of instruction begins to diminish.

A second factor to be considered was the method of instruction. When introducing new keys, teacher-directed instruction should last for approximately 10 minutes, followed by a 20-minute practice session (Dennee, 1989). Research was unavailable to indicate the appropriate amount of time needed to introduce the keyboard using the computer-assisted method.

A third factor to be considered when deciding the length of keyboarding instruction was the program objectives. Some school

districts may decide to include only instruction in the alphabetic keys while others may decide to introduce both alphabetic and numeric keys. Hoggatt et al. (1988) recommended that the alphabetic keyboard requires approximately 17 hours of instruction while Milkes (1987) suggested that 20 hours of instruction was a sufficient amount of time to introduce the alphabetic and numeric keys. Sormunen (1988) concluded that 15 or less hours of keyboarding instruction is an inadequate amount of time to develop an efficient keyboarding skill.

Evaluation

The method of evaluation in pre-secondary keyboarding would depend on factors such as grade level, length of instruction, and objective(s) of the program. Kimball and Lane (1989) reported that at the elementary school level, where there is limited keyboarding instruction, emphasis should be placed on developing proper keyboarding techniques so that students form a strong foundation. Jackson and Berg (1986) noted that if incorrect technique is being used, teachers should make immediate adjustments. Headley (1983) stated that "Formal grading and evaluation should not be a concern of a short keyboarding program" (p. 18). Furthermore, formal grading systems were very difficult to establish because the purpose of elementary keyboarding is not to measure a student's productivity (Headley, 1983). Dennee (1989) and Kimball and Lane (1989) strongly recommended a pass/fail system of evaluation if grading is required.

Kimball and Lane (1989), in their national survey of pre-secondary keyboarding instructors, found that 88% of the

respondents evaluated students on proper keyboarding techniques. Eighty-one percent of the respondents based their evaluation on speed and accuracy and 40% evaluated by means of written tests or an appropriate setup of assigned tasks. These findings reflect that some instructors evaluated more than one criteria.

At the junior high/middle school level, a greater emphasis could be placed on speed and accuracy. Normally courses at this level meet for longer periods of time and the maturity level of students would allow students to produce copy at a faster pace. Sormunen et al. (1989) commented that speed can be evaluated by timed writings, and accuracy can be checked by proofreading.

Sequential Exposure to Instruction

Robinson (1985) reported that keyboarding is a cumulative skill which involves developing a sequential series of activities; therefore, a student's initial exposure to keyboarding should be one that lays the proper foundation upon which further skill may be built. Hedley (1985) emphasized that during the introductory stages, ample sessions should be provided that allow for mass practice of this new skill.

Weekly 30-minute review sessions should be provided throughout the initial year of instruction (Jackson & Berg, 1986). Keyboarding skills should be reinforced every year thereafter, and instruction should include monitoring of proper technique, practicing keying skills, simple formatting, creative writing, or other computer literacy activities (Headley, 1983). Sowers (1989) noted that in future months and years, an adequate amount of time should be provided

so that the skill can be reinforced. If reinforcement activities are not provided, the level of the student's proficiency might diminish to the point where it is no longer a usable skill.

Summary of Related Literature

The literature review for this study related to the major topics of teacher preparation/certification and keyboarding practices. Information was gathered from journals related to elementary and business education.

Teacher preparation/certification. Teachers in all public schools are required to possess certification. Certification to instruct keyboarding, however, is not mandated. It is simply the responsibility of the local school entity to assure that any keyboarding instructor is qualified to perform his/her assigned responsibilities.

Teacher education institutions seemed to be providing little formal training in computer education, which includes keyboarding. Therefore, inservice programs appeared to be the most appropriate means by which individuals prepared themselves to teach keyboarding. Regardless of the method of preparation, it was recommended that keyboarding instructors receive education and instruction in the traits, needs, and interests of the student age group with whom they will be dealing. The instructor should also have the ability to operate a computer, use the touch method of keyboarding, and be able to teach a psychomotor skill.

Keyboarding practices. Developing keyboarding techniques that enable students to form proper habits and make efficient use of the computer was the primary objective of instruction. Therefore, evaluation should be based on this objective. With the influx of computers in the elementary and junior high/middle schools, keyboarding instruction on this type of equipment seemed most appropriate.

The consensus of the literature was that keyboarding proficiency was best attained through the touch method of keying/typing. Students with adequate keyboarding skills can communicate with a computer more efficiently.

With the advent of the computer came the development of numerous software packages that allow students to learn keyboarding at their own pace. Regardless of the method of instruction (teacher-directed, computer-directed, or a combination), teacher supervision is paramount. Instructional materials to support the method of instruction are numerous and include computer software programs, publishers' textbooks, and teacher-created materials. Teachers should evaluate instructional materials with regard to their potential for skill development.

Research varied regarding the grade level where keyboarding should be introduced. It appears that students are physiologically more capable of developing keyboarding skills beginning at the third grade level and that students should develop keyboarding skills just prior to the time they apply the skill. The amount of time devoted to keyboarding instruction varied widely and was affected by students'

age, program objectives, and method of instruction. It was noted that sequential activities must be provided throughout the curriculum to reinforce a student's proficiency in keyboarding.

Keyboarding is an extremely valuable skill. School districts and decision makers must be aware of the issues related to this topic as they implement and/or administer keyboarding programs.

Chapter 3

PROCEDURES

The general purpose of this study was to describe the status of keyboarding instruction at the pre-secondary level in the public schools of Pennsylvania. This chapter includes the population, instrumentation, data collection, and data analysis programs.

Population

This study included each of the 501 school districts in the State of Pennsylvania. Names and addresses of the school districts were provided by personnel from the Pennsylvania Department of Education.

A letter (Appendix A) was sent to the superintendent of each school district requesting him/her to forward the cover letter (Appendix B) and survey instrument (Appendix C) to an individual in the school district who was responsible for teaching any formal introductory keyboarding experience at the pre-secondary level. It was possible that in some school districts more than one individual was responsible for teaching the formal introductory keyboarding experience; however, only one survey instrument was requested to be returned per school district. Since the letter to the superintendent was a critical element in the process, it was reviewed for clarity by several administrators in the Carlisle Area School District. The population in this study was unique from previous research (Condon et al., 1989; Prigge, 1988; Sormunen et al., 1989) in that it involved gathering information from certified business educators, as well as

non-certified business educators and included grades K-8 as opposed to just grades K-6.

Instrumentation

A survey instrument was developed to collect data pertaining to the three research questions. Instrument questions were developed by the researcher using studies conducted by Condon et al. (1989), Prigge (1988), and Sormunen et al. (1989).

The survey instrument was divided into two sections. Section I consisted of questions that provided descriptive information about pre-secondary keyboarding teachers and their instructional practices. Questions 1 through 9 provided the following descriptive information about pre-secondary keyboarding teachers:

Question(s)

1. grade level(s) where keyboarding was being taught,
- 2-4. years experience in teaching pre-secondary keyboarding and teachers' area(s) of certification,
5. preparation through teacher education program,
- 6-7. formal and informal methods of preparation,
8. knowledge of the touch method of keyboarding, and
9. instruction using the touch method of keyboarding.

Questions 10 through 19 provided the following information related to the instructional practices of pre-secondary keyboarding teachers:

Question(s)

10. kind(s) of equipment,
11. primary method(s) of instruction,

12. instructional materials,
- 13-14. keyboarding objectives,
- 15-16. reinforcement and articulation,
17. evaluation, and
- 18-19. length of keyboarding instruction.

Section II consisted of statements that measured pre-secondary keyboarding teachers' perceptions regarding selected issues relating to teaching keyboarding:

Statements

- 20-26. appropriateness of keyboarding in the pre-secondary curriculum,
- 27-31. value of developing keyboarding skills, and
- 32-36. qualifications of keyboarding instructors.

The survey instrument was validated (content and face validity) using 12 high school business educators and 12 junior high/middle school teachers in central Pennsylvania schools. The validation followed the procedures recommended by Prigge (1988) and Sormunen et al. (1989). It was pilot tested in the two middle schools of the Carlisle Area School District. The survey instrument was then revised and printed. Permission to use the instrument per study procedures was obtained from the Office for the Protection of Human Subjects, The Pennsylvania State University (Appendix D).

Data Collection

A cover letter and survey instrument were sent, via superintendents, to an individual in each school district who was

responsible for teaching any formal introductory keyboarding experience at the pre-secondary level. It was noted in the cover letter that keyboarding need not be a self-contained course; in fact, in most cases keyboarding instruction at the pre-secondary level is a small unit taught as part of a computer literacy program.

In addition to explaining the purpose and objectives of the study, the cover letter requested the keyboarding instructor to complete the survey instrument and return it to the researcher in the self-addressed envelope that was enclosed. Identification of the individual completing the survey instrument was not requested; however, the name of the school district was sought for the purpose of obtaining descriptive categorical information for the school district. If keyboarding was not taught at the pre-secondary level in a particular school district, the superintendent was requested to return the survey instrument indicating such.

Follow-up letters (Appendices E & F) were sent to school districts which did not return the survey instrument within one month. A special effort was made to secure survey returns from school districts located in major metropolitan areas.

Data Analysis

SPSS-X was the statistical data analysis program used. The primary statistics involved the descriptive statistics of the mean, percentage, and correlation, namely chi-square and Cramer's V. Cramer's V correlation was used when both variables had a nominal scale and the table is an R by C table. It is a measure of

association for nominal variables (Hinkle, Wiersma, & Jurs, 1982). A correlation of .01 to a .09 is a negligible relation. A correlation of .10 to a .29 is a low relation. A correlation of .30 to a .49 is a moderate relation. A correlation of .50 to a .69 is a substantial relation. A correlation of .70 or higher is a very strong relation (Barrick, McCracken, Miller, VanTilburg, & Warmbroad, 1987).

The presentation of findings in Chapter 4 was organized in a sequence following the order of the research questions. Figure 1 contains information regarding the relation of specific survey form questions to specific aspects of each research question.

Instructional Practices/Issues	Survey Form Question(s)
Grade Level	1
Years of Experience and Certification	2, 3, 4
Teacher Education	5
Formal and Informal Preparation	6, 7
Keyboarding Objectives	13, 14
Equipment	10
Touch Typing	8, 9
Method of Instruction	11
Instructional Materials	12
Length of Instruction	18, 19
Evaluation	17
Sequential Exposure to Instruction	15, 16
Appropriateness of Keyboarding in the Pre-Secondary Curriculum	20-26
Value of Developing Keyboarding Skills	27-31
Qualifications of Keyboarding Instructors	32-36

Figure 1. Relation of Survey Form Questions to Major Variables Investigated.

Chapter 4

FINDINGS

Background

The purpose of this chapter is to provide results relative to the study which investigated the pre-secondary keyboarding instructional practices in local schools and perceptions of pre-secondary keyboarding instructors relative to selected issues. The findings of this study should provide useful information to school districts, pre-secondary keyboarding teachers, officials of the Pennsylvania Department of Education, and members of the Pennsylvania Business Education Association as they plan and implement pre-secondary keyboarding courses.

On October 1, 1990, a cover letter was mailed to the superintendent for each of Pennsylvania's 501 school districts requesting that they forward an attached survey instrument to an individual in their school district who was responsible for teaching any formal, introductory pre-secondary keyboarding experience. A total of 304 (60.6%) survey instruments were returned by October 31, 1990. On November 1, 1990, a follow-up letter and another survey instrument were sent to those who had not responded. This generated an additional 112 (22.4%) responses. The total number of survey instruments returned was 416 (83.0%). The responses to the survey instrument are summarized in Table 1.

The Public Schools Summary of Enrollments 1989-90 (Pennsylvania Department of Education, 1990) indicated that school enrollments for

Table 1. Distribution of Returns to the Mailings.

Response	N Sent	N Returned	Return Percent of Total
Initial Mailing	501	304	60.6
Follow-up	197	112	22.4

Total	xxx	416	83.0

grades K-12 in Pennsylvania's 501 public schools range in size from 216 to 189,451 students. The researcher divided the 501 school districts into four relatively-equal (in terms of numbers) categories according to student population. Table 2 reports the number of school districts in each category and the actual number of schools from those categories that responded to the survey. The information revealed that a very similar distribution exists regarding student population in the schools responding with the actual distribution of schools.

Table 3 shows that a total of 282 (67.8%) school districts responding to the survey currently offer a pre-secondary keyboarding program. One hundred thirty-four (32.2%) school districts offer no program. It should be noted that 31 of 33 school districts with a student population over 7,000 students responded to the study. The likelihood of a school district offering pre-secondary keyboarding was not a function of size. An almost equal distribution of schools offering formal pre-secondary keyboarding programs exists across

Table 2. Distribution of Respondents by School Size Compared with the Actual Distribution of Schools in Pennsylvania by School Size.

Student Population	Number of School Districts		Actual School Districts Responding	
	<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>
0-1499	125	25.0	109	26.2
1500-2499	152	30.2	120	28.8
2500-3499	113	22.6	95	22.8
3500 and over	111	22.2	92	22.2

Total	501	100.0	416	100.0

Table 3. Distribution of School Districts Offering Pre-Secondary Keyboarding by School Size.

Student Population	Offer Pre-Secondary Keyboarding Program		Does Not Offer Pre-Secondary Keyboarding Program	
	<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>
0-1499	71	25.2	38	28.4
1500-2499	81	28.7	39	29.1
2500-3499	62	22.0	33	24.6
3500 and over	68	24.1	24	17.9

Total	282	100.0	134	100.0

Note. The 282 school districts with pre-secondary keyboarding programs represents 67.8% of the 416 schools who responded.

schools of various sizes (student population). The findings reported in the study reflect responses to the survey questions and perception statements for the 282 schools. Of the 282 respondents who were teaching pre-secondary keyboarding, there were 121 business education certified teachers and 161 non-business education certified teachers.

Instructional Practices of Pre-Secondary Keyboarding Instructors

Section I of the survey instrument contained 19 questions pertaining to the major variables investigated in the study. The subsections that follow report the findings relative to the instructional practices of pre-secondary keyboarding instructors; namely, grade level, years of experience and certification, teacher education, formal and informal preparation, keyboarding objectives, equipment, touch typing, method of instruction, instructional materials, length of instruction, evaluation, and sequential exposure to instruction.

Grade Level Where Keyboarding Is Taught

Table 4 indicates the various grade level(s) where respondents reported teaching pre-secondary keyboarding. Since teachers were asked to indicate all grade levels where they formally taught an introductory keyboarding experience, the total number of responses for grade level exceeded the number of respondents. The largest proportion of business education certified respondents reported teaching keyboarding at the seventh (48.8%) and eighth (44.6%) grade level. The non-business education certified respondents reported

Table 4. Grade Level(s) Where Teachers with Various Certification Areas Reported Pre-Secondary Keyboarding Was Taught.

Grade Level Where Keyboarding is Taught by Teacher Certification Area	N	Response			
		Yes		No	
		N	%	N	%
Kindergarten					
Business Education Certified	121	1	.8	120	99.2
Non-Business Education Certified	161	11	6.8	150	93.2
Combined	282	12	4.3	270	95.7
First Grade					
Business Education Certified	121	1	.8	120	99.2
Non-Business Education Certified	161	16	9.9	145	90.1
Combined	282	17	6.0	265	94.0
Second Grade					
Business Education Certified	121	1	.8	120	99.2
Non-Business Education Certified	161	18	11.2	143	88.8
Combined	282	19	6.7	263	93.3
Third Grade					
Business Education Certified	121	2	1.7	119	98.3
Non-Business Education Certified	161	44	27.3	117	72.7
Combined	282	46	16.3	236	83.7
Fourth Grade					
Business Education Certified	121	11	9.1	110	90.9
Non-Business Education Certified	161	62	38.5	99	61.5
Combined	282	73	25.9	209	74.1

(continued on next page)

Table 4 (Continued)

Grade Level Where Keyboarding is Taught by Teacher Certification Area	<u>N</u>	<u>Yes</u>		<u>Response</u>	
		<u>N</u>	<u>%</u>	<u>No</u>	<u>%</u>
Fifth Grade					
Business Education Certified	121	10	8.3	111	91.7
Non-Business Education Certified	161	80	49.7	81	50.3
Combined	282	90	31.9	192	68.1
Sixth Grade					
Business Education Certified	121	28	23.1	93	76.9
Non-Business Education Certified	161	85	52.8	76	47.2
Combined	282	113	40.1	169	59.9
Seventh Grade					
Business Education Certified	121	59	48.8	62	51.2
Non-Business Education Certified	161	59	36.6	102	63.4
Combined	282	118	41.8	164	58.2
Eighth Grade					
Business Education Certified	121	54	44.6	67	55.4
Non-Business Education Certified	161	49	30.4	112	69.6
Combined	282	103	36.5	179	63.5

teaching keyboarding at the fifth (49.7%) and sixth (52.8%) grade levels most frequently.

The initial grade level where they taught a formal, introductory experience in keyboarding, as reported by the respondents, is summarized in Table 5. Seventy-nine (65.3%) business education certified respondents taught at the seventh and eighth grade levels. Approximately one-third (33.9%) of the business education certified respondents taught at the third through sixth grade levels. Only one (0.8%) business education certified respondent taught keyboarding below the third grade level.

Table 5. Grade Level Where Initial, Formal Course in Keyboarding Is Offered.

Grade Level Where Keyboarding is Taught by Teacher Certification Area	N	Grade									
		K	1	2	3	4	5	6	7	8	
Business Education Certified	121	1	0	0	1	10	6	24	44	35	
Non-Business Education Certified	161	11	7	4	25	28	28	25	22	11	
Combined	282	12	7	4	26	38	34	49	66	46	

One hundred six (65.8%) non-business education certified respondents taught keyboarding at the third through sixth grade level while 22 (13.7%) non-business education certified respondents taught their initial experience at the kindergarten through second grade levels. When collectively considering all teachers, 259 (91.8%) of

the respondents taught their initial, formal introductory experience at the third through eighth grade levels.

Years of Experience and Certification Area

Survey respondents were requested to indicate the number of years they had taught keyboarding at the pre-secondary level. The survey instructed teachers to include the current year as a year of experience.

Approximately three-fourths (73.6%) of the business education certified respondents indicated that they had between one and five years experience teaching keyboarding at the pre-secondary level as compared to 79.5% of the non-business education certified respondents (Table 6). Only 10 (8.3%) business education certified respondents taught pre-secondary keyboarding between six and eight years as compared to 25 (15.5%) non-business education certified respondents. However, 22 (18.2%) business education certified respondents had nine or more years experience teaching pre-secondary keyboarding as compared to 8 (5.0%) non-business education certified respondents. A combined total of 217 (77.0%) teachers responded that they had between one and five years experience teaching pre-secondary keyboarding.

Survey questions three and four requested respondents to report their area of certification/responsibility. Table 7 shows that 121 (42.8%) business education certified respondents to this study are currently teaching keyboarding at the pre-secondary level. Approximately one-third (31.1%) of the respondents possess elementary education certification. Twenty-eight (9.8%) of the respondents

Table 6. Respondents' Years of Experience Teaching Pre-Secondary Keyboarding.

Years by Teacher Certification Area	N	Percent
One Year		
Business Education Certified	26	21.5
Non-Business Education Certified	23	14.3
Combined	49	17.4
Two Years		
Business Education Certified	17	14.0
Non-Business Education Certified	40	24.8
Combined	57	20.2
Three Years		
Business Education Certified	16	13.2
Non-Business Education Certified	24	14.9
Combined	40	14.2
Four Years		
Business Education Certified	14	11.6
Non-Business Education Certified	20	12.4
Combined	34	12.1
Five Years		
Business Education Certified	16	13.2
Non-Business Education Certified	21	13.0
Combined	37	13.1
Six Years		
Business Education Certified	6	5.0
Non-Business Education Certified	13	8.1
Combined	19	6.7
Seven Years		
Business Education Certified	1	.8
Non-Business Education Certified	8	5.0
Combined	9	3.2
Eight Years		
Business Education Certified	3	2.5
Non-Business Education Certified	4	2.5
Combined	7	2.5
More Than Eight Years		
Business Education Certified	22	18.2
Non-Business Education Certified	8	5.0
Combined	30	10.6

Table 7. Certification/Responsibility Area for Pre-Secondary Keyboarding Teachers.

Area of Certification Area of Responsibility	<u>N</u>	%
Business Education	121	42.8
Elementary Education	88	31.1
Mathematics	28	9.8
Computer Literacy	14	5.0
Library Science	6	2.1
Biology	3	1.1
English	3	1.1
Graphic Arts	3	1.1
Social Studies	3	1.1
Computer Aide	2	.7
Home Economics	2	.7
Science	2	.7
Special Education	2	.7
Art	1	.4
Data Processing	1	.4
Instructional Technology	1	.4
Program Specialist	1	.4
School Administrator	1	.4

Total	282	100.0

Indicated that they are certified in mathematics. A wide variety of areas of certification/responsibility were reported by the remaining 45 (16.3%) respondents.

Keyboarding Instruction in Teacher Preparation Program

In regard to survey question five, did your college teacher education program offer formal instruction for teaching keyboarding, 97 (80.2%) business education certified respondents reported receiving such training. Conversely, 155 (96.3%) non-business education certified respondents did not receive any formal instruction on how to teach keyboarding during their teacher preparation program (Table 8).

Table 8. Teacher Preparation Program Offered Formal Instruction for Teaching Keyboarding.

Area of Certification	N	Response			
		Yes		No	
		N	%	N	%
Business Education Certified	121	97	80.2	24	19.8
Non-Business Education Certified	161	6	3.7	155	96.3
Combined	282	103	36.5	179	63.5

Type of Formal and Informal Preparation for Teaching Keyboarding

The number of respondents receiving formal education and the type of preparation to instruct keyboarding is reported in Table 9. Respondents were instructed to check as many of the selections (types of preparation) as applicable. One hundred twenty (99.2%) business

Table 9. Type of Formal Preparation Completed by Teachers to Instruct Keyboarding.

Type of Formal Preparation Completed by Area of Certification	N	Response			
		Yes		No	
		N	%	N	%
No Formal Preparation					
Business Education Certified	121	1	.8	120	99.2
Non-Business Education Certified	161	32	19.9	129	80.1
Combined	282	33	11.7	249	88.3
Keyboarding/Typewriting Course(s)					
Business Education Certified	121	113	93.4	8	6.6
Non-Business Education Certified	161	89	55.3	72	44.7
Combined	282	202	71.6	80	28.4
Methods of Teaching Keyboarding/ Typewriting Course(s)					
Business Education Certified	121	110	90.9	11	9.1
Non-Business Education Certified	161	21	13.0	140	87.0
Combined	282	131	46.5	151	53.5
Word Processing Course(s)					
Business Education Certified	121	77	63.6	44	36.4
Non-Business Education Certified	161	95	59.0	66	41.0
Combined	282	172	61.0	110	39.0

education certified respondents received some type of formal training. Formal training for business education certified respondents included keyboarding/typewriting courses (113, 93.4%), methods of teaching keyboarding/typewriting courses (110, 90.9%), and word processing courses (77, 63.6%).

The majority of the non-business education certified respondents (80.1%) indicated they received some formal preparation to instruct keyboarding. Their training included keyboarding/typewriting courses (89, 55.3%), methods of teaching keyboarding/typewriting courses (21, 13.0%), and word processing courses (95, 59.0%).

Survey question seven requested respondents to indicate how they have informally prepared themselves to instruct keyboarding (Table 10). Similar to question six, respondents could choose more than one selection. Business education certified respondents' informal preparation included independent study/reading (90, 74.4%); help from other business education teachers (50, 41.3%); help from teachers other than business education teachers (23, 19.0%); university-sponsored inservice training (22, 18.2%); school district-sponsored inservice training (14, 11.6%); both university- and school district-sponsored inservice training (5, 4.1%); and, workshops/seminars (49, 40.5%).

Methods that non-business education certified respondents informally used to prepare themselves to instruct keyboarding included independent study/reading (137, 85.1%); help from business education teachers (52, 32.3%); help from teachers other than business education teachers (39, 24.2%); university-sponsored inservice training (16,

Table 10. Type of Informal Preparation Completed by Teachers to Instruct Keyboarding.

Type of Informal Preparation Completed by Area of Certification	N	Response			
		Yes		No	
		N	%	N	%
Independent Study/Reading					
Business Education Certified	121	90	74.4	31	25.6
Non-Business Education Certified	161	137	85.1	24	14.9
Combined	282	227	80.5	55	19.5
Help from Business Education Teachers					
Business Education Certified	121	50	41.3	71	58.7
Non-Business Education Certified	161	52	32.3	109	67.7
Combined	282	102	36.2	180	63.8
Help from Teachers other than Business Educators					
Business Education Certified	121	23	19.0	98	81.0
Non-Business Education Certified	161	39	24.2	122	75.8
Combined	282	62	22.0	220	78.0
Inservice Training Sessions/ University Sponsored					
Business Education Certified	121	22	18.2	99	81.8
Non-Business Education Certified	151	16	10.0	145	90.0
Combined	282	38	13.5	244	86.5
Inservice Training Sessions/ School District Sponsored					
Business Education Certified	121	14	11.6	107	88.4
Non-Business Education Certified	161	34	21.1	127	78.9
Combined	282	48	17.0	234	83.0
Inservice Training Sessions/ University and School District					
Business Education Certified	121	5	4.1	116	95.9
Non-Business Education Certified	161	10	6.2	151	93.8
Combined	282	15	5.3	267	94.7
Workshop/Seminar					
Business Education Certified	121	49	40.5	72	59.5
Non-Business Education Certified	161	57	35.4	104	64.6
Combined	282	106	37.6	176	62.4

10.0%); school district-sponsored inservice training (34, 21.1%); both university- and school district-sponsored inservice training (10, 6.2%); and, workshops/seminars (57, 35.4%).

Space was provided for respondents to list other means by which they had informally prepared themselves to instruct keyboarding. A combined total of 20 teachers, citing a variety of methods, responded to this item.

Keyboarding Objectives

Question 13 of the survey instrument asked respondents to indicate whether their school had stated, specific objectives for teaching keyboarding. Two hundred thirty-seven (84.0%) of the respondents indicated their school had a formal plan while 45 (16.0%) respondents reported no such plan exists in their school.

In regard to survey question 14, respondents were asked to indicate their stated, specific student objectives for teaching keyboarding. Respondents were directed to check as many of the objectives listed on the instrument as were applicable.

Forming good keyboarding habits was an objective of 106 (87.6%) business education certified respondents (Table 11). Eighty-six (71.1%) business education certified respondents indicated their objective was to have students use time at the microcomputer/typewriter more efficiently. Approximately three-fourths (73.6%) of the business education certified respondents stated that they have an objective of developing students' speed and accuracy. Less than one-half (43.0%) of the business education certified respondents

Table 11. Distribution of Schools with Stated, Specific Objectives for Teaching Keyboarding by Teacher Certification Area.

Number of Schools and Objectives by Teacher Certification Area	<u>N</u>	<u>Response</u>			
		<u>Yes</u>		<u>No</u>	
		<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>
Number of Schools	282	237	84.0	45	16.0
Objectives					
Form Good Keyboarding Habits					
Business Education Certified	121	106	87.6	15	12.4
Non-Business Education Certified	161	114	70.8	47	29.1
Combined	282	220	78.0	62	22.0
Use Time Efficiently					
Business Education Certified	121	86	71.1	35	28.9
Non-Business Education Certified	161	98	60.9	63	39.1
Combined	282	184	65.2	98	34.8
Develop Speed and Accuracy					
Business Education Certified	121	89	73.6	32	26.4
Non-Business Education Certified	161	69	42.9	92	57.1
Combined	282	158	56.0	124	44.0
Develop Language Arts Skills					
Business Education Certified	121	52	43.0	69	57.0
Non-Business Education Certified	161	56	34.8	105	65.2
Combined	282	108	38.3	174	61.7

expressed that developing language arts skills was one of their student objectives.

One hundred fourteen (70.8%) of the non-business education certified respondents cited that forming good keyboarding habits was one of their student objectives for teaching keyboarding. Three-fifths (60.9%) of the non-business education certified respondents identified one of their keyboarding objectives was to have students use time at the microcomputer/typewriter more efficiently. Developing speed and accuracy was the objective of 69 (42.9%) of the non-business education certified respondents, and 56 (34.8%) indicated that developing language arts skills was one of their keyboarding objectives.

Space was provided for respondents to list other student objectives not printed on the instrument. Other objectives, expressed by a total of 10 respondents, included formatting documents (3), understanding components of microcomputer (3), listening and reading skills (3), and the establishment of positive work habits (1).

Equipment Used in Teaching

In regard to survey question 10, the kinds of equipment used to teach keyboarding, respondents were asked to check whether they used microcomputers, electronic typewriters, electric typewriters, and/or manual typewriters. Respondents were asked to indicate all the types of equipment that they currently used to instruct keyboarding; therefore, the total number of responses may exceed the number of respondents.

Table 12 shows that nearly three-fourths (73.6%) of the business education certified respondents were using microcomputers for keyboarding instruction. Fifty-one (42.1%) of the business education certified respondents were using electronic typewriters and 44 (36.4%) were using electric typewriters. No business education certified respondents reported using manual typewriters for keyboarding instruction.

Table 12. Kinds of Equipment Being Used to Teach Keyboarding.

Type of Equipment Used by Teacher Certification Area	<u>N</u>	<u>Response</u>			
		<u>Yes</u>		<u>No</u>	
		<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>
Microcomputers					
Business Education Certification	121	89	73.6	32	26.4
Non-Business Education Certified	161	160	99.4	1	.6
Combined	282	249	88.3	33	11.7
Electronic Typewriters					
Business Education Certified	121	51	42.1	70	57.9
Non-Business Education Certified	161	3	1.9	158	98.1
Combined	282	54	19.1	228	80.9
Electric Typewriters					
Business Education Certified	121	44	36.4	77	63.6
Non-Business Education Certified	161	10	6.2	151	93.8
Combined	282	54	19.1	228	80.9
Manual Typewriters					
Business Education Certified	121	0	0.0	121	100.0
Non-Business Education Certified	161	5	3.1	156	96.9
Combined	282	5	1.8	277	98.2

Approximately every non-business education certified respondent (99.4%) used microcomputers for keyboarding instruction. Three (1.9%)

non-business education certified respondents reported using electronic typewriters, 10 (6.2%) indicated they use electric typewriters, and five (3.1%) use manual typewriters for keyboarding instruction. Respondents were afforded the opportunity to list any other types of equipment used to instruct keyboarding. Ten non-business education certified respondents reported using facsimiles while two respondents stated they use cardboard templates.

Touch Typing as a Teaching Strategy

Survey questions eight and nine inquired as to whether respondents knew how to use the touch method of keyboarding/typewriting and if they teach the touch method to their students. All 121 (100%) business education certified respondents reported knowing how to use the touch method of typing (Table 13). Similarly, all 121 (100%) business education certified respondents teach the touch method to their students.

The majority of the non-business education certified respondents (94.4%) stated that they know how to use the touch method. More than four-fifths (85.7%) of the non-business education certified respondents stated that they teach the touch method to their students.

Method of Instruction

In regard to survey question 11, what is the primary method of instruction used to instruct keyboarding, the majority of the business education certified respondents (58.7%) reported that they use the teacher-directed method of instruction. Only 7 (5.8%) business education certified respondents use the computer-directed method of

Table 13. Respondents' Knowledge and Use of Touch Method of Keyboarding/Typewriting.

Knowledge and Use Of Touch Method by Teacher Certification Area	<u>N</u>	<u>Response</u>			
		<u>Yes</u>		<u>No</u>	
		<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>
Knowledge of Touch Method of Keyboarding/Typewriting					
Business Education Certified	121	121	100.0	0	0.0
Non-Business Education Certified	161	152	94.4	9	5.6
Combined	282	273	96.8	9	3.2
Teach the Touch Method of Keyboarding/Typewriting					
Business Education Certified	121	121	100.0	0	0.0
Non-Business Education Certified	161	138	85.7	23	14.3
Combined	282	259	91.8	23	8.2

Instruction while 43 (35.5%) reported using a combination of the teacher-directed and computer-directed method of instruction.

Almost one-half (45.3%) of the non-business education certified respondents use the computer-directed method of instruction. Only 16 (9.9%) non-business education certified respondents stated they use the teacher-directed method of instruction while 72 (44.7%) reported using a combination of the teacher-directed and computer-directed method of instruction. Table 14 shows the total number of responses in each category.

Instructional Materials

Survey question 12 asked respondents to check the various types of instructional materials they used to teach keyboarding. Respondents were also requested to name any software programs,

Table 14. Primary Method of Instruction used in Teaching Keyboarding.

Area of Certification	Method of Instruction					
	Teacher Directed		Computer Directed		Combination	
	<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>
Business Education Certified	71	58.7	7	5.8	43	35.5
Non-Business Education Certified	16	9.9	73	45.3	72	44.7
Combined	87	30.9	80	28.4	115	40.8

textbooks, teacher-made materials, or other materials they used for instructional purposes.

Three-fifths (60.3%) of the business education certified respondents reported using computer software programs for instructional purposes (Table 15). Ninety-two (76.0%) business education certified respondents used textbooks and 53 (43.8%) indicated they used teacher-prepared materials.

The majority of non-business education certified respondents (93.8%) reported using computer software programs to assist in keyboarding instruction. Only 19 (11.8%) of the non-business education certified respondents indicated they used textbooks for instructional purposes and 46 (28.6%) used teacher-made materials.

Respondents listed numerous software packages being used for keyboarding instruction. The most frequently mentioned software packages include Minnesota Educational Computer Consortium (MECC), Microtype: The Wonderful World of PAWS, Typing Tutor, Type to Learn, Master Type, and Mavis Beacon.

Table 15. Instructional Materials Used in Teaching Keyboarding.

Type of Materials	<u>N</u>	<u>Response</u>			
		<u>Yes</u>		<u>No</u>	
		<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>
Computer Software Programs					
Business Education Certified	121	73	60.3	48	39.7
Non-Business Education Certified	161	151	93.8	10	6.2
Combined	282	224	79.4	58	20.6
Textbook(s)					
Business Education Certified	121	92	76.0	29	24.0
Non-Business Education Certified	161	19	11.8	142	88.2
Combined	282	111	39.4	171	60.6
Teacher-made Materials					
Business Education Certified	121	53	43.8	68	56.2
Non-Business Education Certified	161	46	28.6	115	71.4
Combined	282	99	35.1	183	64.9

Survey respondents indicated using a wide selection of textbooks for keyboarding instruction. The most frequently utilized textbooks were published by South-Western Publishing Company and MacMillan/McGraw-Hill Book Company.

Length of Instruction

The number and length of classes to introduce keyboard keys is summarized in Table 16. This particular subsection was not categorized by area of certification due to the fact that time devoted to keyboarding instruction in elementary and junior high/middle schools is most likely limited because of other curricular mandates.

Responses to survey question 18, how many class sessions are devoted to introducing keyboard keys, show that 71 (25.2%) of the

Table 16. Number and Length of Class Sessions to Introduce Keyboard Keys ($N = 282$).

Number and Length of Sessions	<u>N</u>	Percent
Number of Sessions		
10 or fewer	71	25.2
11 to 15	45	16.0
16 to 20	54	19.1
21 to 25	35	12.4
26 to 30	54	19.1
31 and over	23	8.2
Length of Sessions (in Minutes)		
10 or fewer	1	.4
11 to 15	10	3.5
16 to 20	9	3.2
21 to 25	7	2.5
26 to 30	26	9.2
31 to 35	11	3.9
36 to 40	62	22.0
41 to 45	134	47.5
46 to 50	21	7.4
51 and over	1	.4

respondents introduce the keys in 10 or fewer sessions. Ninety-nine (35.1%) of the respondents used from 11 to 20 sessions to introduce keys. Approximately one-third (31.5%) of the respondents reported using from 21 to 30 sessions to introduce keys while 23 (8.2%) used 31 or more sessions to introduce keyboard keys.

Survey question 19 requested respondents to indicate the length, in minutes, of class sessions. Fifty-three (18.8%) respondents reported that their class sessions were 30 minutes or shorter. Two hundred seven (73.4%) reported that their class sessions ran from 31 to 45 minutes. Only 22 (7.8%) of the respondents had class sessions that exceeded 45 minutes.

Evaluation

In regard to survey question 17, how do you evaluate performance in keyboarding, 107 (88.4%) business education certified respondents reported using some method of formal evaluation compared to approximately one-half (48.4%) of the non-business education certified respondents (Table 17). Since respondents were requested to indicate all methods of evaluation, the total number of responses exceeded the number of respondents.

Sixty-eight (56.2%) business education certified respondents grade students based on speed and accuracy. Eighty-four (69.4%) business education certified respondents grade students on technique and 22 (18.2%) grade on a pass/fail system.

Nearly one-fifth (18.0%) of the non-business education certified respondents reported they grade based on speed and accuracy. Thirty-four (21.1%) of the non-business education certified respondents used grades based on technique and 24 (14.9%) graded using the pass/fail system.

Space was provided on the survey instrument for respondents to list other methods by which they evaluate student performance. A total of 44 respondents listed a variety of responses. Other methods of evaluation included: quizzes (12), quality and quantity of work processed (8), document formatting (6), monitoring progress (6), E/S/U grades (5), interdisciplinary projects (2), and composition skills (1). Four respondents indicated that the software programs they used perform the evaluation function.

Table 17. Methods of Evaluating Keyboarding Performance.

Method of Evaluation by Area of Certification	<u>N</u>	<u>Response</u>			
		<u>Yes</u>		<u>No</u>	
		<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>
No Formal Evaluation					
Business Education Certified	121	14	11.6	107	88.4
Non-Business Education Certified	161	83	51.6	78	48.4
Combined	282	97	34.4	185	65.6
Grades Based on Speed and Accuracy					
Business Education Certified	121	68	56.2	53	43.8
Non-Business Education Certified	161	29	18.0	132	82.0
Combined	282	97	34.4	185	65.6
Grades Based on Techniques					
Business Education Certified	121	84	69.4	37	30.6
Non-Business Education Certified	161	34	21.1	127	78.9
Combined	282	118	41.8	164	58.2
Pass/Fail					
Business Education Certified	121	22	18.2	99	81.8
Non-Business Education Certified	161	24	14.9	137	85.1
Combined	282	46	16.3	236	83.7

Sequential Exposure to Instruction

Question 15 of the survey instrument asked respondents to indicate whether their school had a formal plan for developing keyboarding skills throughout the pre-secondary grades. One hundred forty-nine (52.8%) of the respondents indicated their school had a formal plan while 133 (47.2%) respondents reported no such plan exists in their school.

Question 16 of the survey instrument asked respondents to indicate the types of applications used by school districts to develop keyboarding skills. Table 18 shows the number of schools that have a formal plan and the various applications used by school districts. This subsection was not reported by area of certification because sequential offerings of school districts are most likely determined by curriculum directors as opposed to keyboarding instructors. Respondents were asked to check all formal applications their school districts used in developing keyboarding skills; therefore, the total number of responses exceeded the number of respondents.

Nearly one-half (46.8%) of the respondents indicated their school district had a formal plan for developing keyboarding skills through word processing. One hundred thirty-six (48.3%) respondents reported their school district developed the skill through language arts and programming applications. Approximately one-third (29.5%) of the respondents reported their school district developed keyboarding skills through mathematics, social studies, and science applications.

Table 18. Distribution of Schools with a Formal Plan for Developing Keyboarding Skills and Applications Used to Develop Keyboarding Skills.

Number of Schools and Type of Application	<u>N</u>	<u>Response</u>			
		<u>Yes</u>		<u>No</u>	
		<u>N</u>	<u>%</u>	<u>N</u>	<u>%</u>
Number of Schools	282	149	52.8	133	47.2
Type of Application					
Language Arts	282	76	27.0	206	73.0
Programming	282	60	21.3	222	78.7
Mathematics	282	34	12.1	248	87.9
Social Studies	282	26	9.2	256	90.8
Word Processing	282	132	46.8	150	53.2
Science	282	23	8.2	259	91.8

Perceptions of Pre-Secondary Keyboarding Instructors

Section II of the survey instrument contained 17 statements that measured perceptions of pre-secondary keyboarding instructors relative to selected issues classified in three broad areas: the appropriateness of keyboarding in the pre-secondary curriculum, the value of developing keyboarding skills, and the qualifications of keyboarding instructors (research question two). This section also contains the results for the third research question which examined the relationships between teachers' perceptions on the various issues and whether the teacher was business education certified or non-business education certified.

Because of the distribution of responses for the perceptions relative to the issue statements, it was decided to "collapse" the response categories from five response options into three response options. Originally the five response options were strongly disagree, disagree, no opinion, agree, and strongly agree. The final three categories were negative (a combination of disagree and strongly disagree), positive (a combination of agree and strongly agree), and no opinion. This collapsing of categories enabled this investigator to compute a valid chi-square to test for relationships between the certification area of the teachers and their perceptions relative to the issues.

Perceptions Regarding Appropriateness of Keyboarding in the Pre-Secondary Curriculum

The perceptions of pre-secondary keyboarding respondents relative to survey statements 20 through 26 are summarized in Table 19. The complete raw data for the appropriateness of keyboarding in the pre-secondary curriculum statements appears in Appendix G.

The majority of the business education certified respondents (95.0%) reacted positively to survey statement 20, "keyboarding should be taught at the pre-secondary level." Similarly, 94.4% of the non-business education certified respondents reacted positively to this statement. A valid chi-square was not calculated for this statement (see note, Table 19).

In regard to survey statement 21, "students should be taught keyboarding skills before they are allowed to use computers," 71.1% of the business education certified respondents reacted positively while

Table 19. Pre-Secondary Keyboarding Instructors' Perceptions About Appropriateness of Keyboarding in the Pre-Secondary Curriculum by Teacher's Area of Certification.

Statement and Response	Business Education Certified (<u>N</u> = 121) %	Non-Business Education Certified (<u>N</u> = 161) %	Chi-square	Cramer's V
Keyboarding Should be Taught at the Pre-Secondary Level				
Negative	4.1	4.3	Refer to Note	
No Opinion	.8	1.2		
Positive	95.0	94.4		
Students Should be Taught Keyboarding Skills Before They are Allowed to use Computers				
Negative	20.7	71.4	76.43***	.52
No Opinion	8.3	7.5		
Positive	71.1	21.1		
There is not Enough Time in the Day to Offer Keyboarding in the Pre-Secondary Curriculum				
Negative	81.8	68.3	6.72*	.15
No Opinion	5.8	11.8		
Positive	12.4	19.9		
It is Preferable to have a Business Educator Teach Keyboarding at the Pre-Secondary Level				
Negative	.8	64.6	176.79***	.79
No Opinion	3.3	19.3		
Positive	95.9	16.1		

(continued on next page)

Table 19. (Continued)

Statement and Response	Business Education Certified (N = 121) %	Non-Business Education Certified (N = 161) %	Chi-square	Cramer's V
Pre-Secondary Teachers and Business Educators Should Team Teach Keyboarding at the Pre-Secondary Level				
Negative	47.1	44.1	6.31*	.14
No Opinion	13.2	24.8		
Positive	39.7	31.1		
Students Can Learn to Keyboard by Themselves				
Negative	95.9	68.9	31.99***	.33
No Opinion	.8	9.9		
Positive	3.3	21.1		
Keyboarding Should be a Self-Contained Course				
Negative	15.7	47.8	41.06***	.38
No Opinion	10.7	16.1		
Positive	73.6	36.0		

Note. A valid chi-square was not able to be calculated because the distribution of responses resulted in >20% of the cells having an expected frequency <5.

* Significant .05

** Significant .01

*** Significant .001

71.4% of the non-business education certified respondents reacted negatively ($\chi^2 = 76.43$, $p < .001$). This represented a substantial relationship between teacher's area of certification and whether students should be taught keyboarding before they use computers (Cramer's $V = .52$).

In response to respond to survey statement 22, "there is not enough time in the day to offer keyboarding in the pre-secondary curriculum," 81.1% of the business education certified respondents and 68.3% of the non-business education certified respondents reported a negative answer ($\chi^2 = 6.72$, $p < .05$). This represented a low relationship (Cramer's $V = .15$) between teacher's area of certification and teacher's response.

Survey statement 23 was, "It is preferable to have a business educator teach keyboarding at the pre-secondary level." A large majority of the business education certified respondents (95.9%) agreed. On the other hand, 64.6% of the non-business education certified respondents responded negatively ($\chi^2 = 176.79$, $p < .001$). The Cramer's V of .79 represents a very strong relationship between teacher's area of certification and teacher's response.

In regard to survey statement 24, "pre-secondary teachers and business educators should team teach keyboarding at the pre-secondary level," 47.1% of the business education certified respondents and 44.1% of the non-business education certified respondents reacted negatively. A positive reaction was reported by 39.7% of the business education certified respondents and 31.1% of the non-business education certified respondents ($\chi^2 = 6.31$, $p < .05$). This

represented a low relationship (Cramer's $V = .14$) between teacher's area of certification and teacher's response.

The response to survey statement 25, "students can learn to keyboard by themselves," found that 95.9% of the business education certified respondents reacted negatively. Considerably less of the non-business education certified respondents (68.9%) reacted negatively. Slightly over one-fifth (21.1%) of the non-business education certified respondents had a positive reaction to this statement (chi-square = 31.99, $p < .001$). This represented a moderate relationship (Cramer's $V = .33$) between teacher's area of certification and teacher's response.

When asked to respond to survey statement 26, "keyboarding should be a self-contained course," nearly three-fourths (73.6%) of the business education certified respondents provided a positive reaction while almost one-half (47.8%) of the non-business education certified respondents reacted negatively. Slightly over one-third (36.0%) of the non-business education certified respondents expressed a positive reaction to this statement (chi-square = 41.06, $p < .001$). This represented a moderate relationship (Cramer's $V = .38$) between teacher's area of certification and teacher's response.

Perceptions About the Value of Developing Keyboarding Skills in the Pre-Secondary Curriculum

The perceptions of pre-secondary keyboarding respondents relative to survey statements 27 through 31 are summarized in Table 20. The complete raw data for the value of developing keyboarding skills in the pre-secondary curriculum statements appears in Appendix H.

Table 20. Pre-Secondary Keyboarding Instructors' Perceptions About the Value of Developing Keyboarding Skills in the Pre-Secondary Curriculum by Teacher's Area of Certification.

Statement and Response	Business Education Certified (N = 121) %	Non-Business Education Certified (N = 161) %	Chi-square	Cramer's V
Students Should be Required to Develop Keyboarding Skills				
Negative	.8	6.2	11.09**	.19
No Opinion	.0	4.3		
Positive	99.2	89.4		
Keyboarding is a Basic Literacy Skill				
Negative	2.5	12.4	10.08**	.18
No Opinion	4.1	6.2		
Positive	93.4	81.4		
The Development of Touch Keyboarding Operations is Necessary for Efficient Operation of a Computer				
Negative	3.3	29.8	36.52***	.35
No Opinion	4.1	8.1		
Positive	92.6	62.1		
Students Who Learn to Keyboard Without Proper Instruction must often Unlearn Improper Techniques				
Negative	4.1	9.3	24.02***	.29
No Opinion	.8	16.8		
Positive	95.0	73.9		

(continued on next page)

Table 20. (Continued)

Statement and Response	Business Education Certified (N = 121) %	Non-Business Education Certified (N = 161) %	Chi-square	Cramer's V
Students Who know how to Touch Type Develop Their Composition Skills Faster than Those who "Hunt and Peck"				
Negative	2.5	8.1		
No Opinion	4.1	16.1	15.45***	.23
Positive	93.4	75.8		

* Significant .05

** Significant .01

*** Significant .001

Survey statement 27, "students should be required to develop keyboarding skills," found that 99.2% of the business education certified respondents reacted positively. A large portion of the non-business education certified respondents (89.4%) also reacted positively ($\chi^2 = 11.09$, $p < .01$). There was a low relationship (Cramer's $V = .19$) between teacher's area of certification and the teacher's response. Non-business education certified respondents tended to have slightly more negative and no opinion perceptions relative to requiring the development of keyboarding skills.

In regard to survey statement 28, "keyboarding is a basic literacy skill," 93.4% of the business education certified respondents indicated a positive reaction. Over four-fifths (81.4%) of the non-business education certified respondents reacted positively to this statement ($\chi^2 = 10.08$, $p < .01$). There was a low relationship between teacher's area of certification and the teacher's response. Business education certified respondents tended to be more positive than non-business education certified respondents (Cramer's $V = .18$).

When asked to respond to survey statement 29, "the development of touch keyboarding operations is necessary for efficient operation of a computer," most of the business education certified respondents (92.6%) showed a positive reaction. Somewhat less of the non-business education certified respondents (62.1%) reacted positively. Almost one-third (29.8%) of the non-business education certified respondents showed a negative reaction ($\chi^2 = 36.52$, $p < .001$). This

represented a moderate relationship (Cramer's $V = .35$) between teacher's area of certification and teacher's response.

The response to survey statement 30, "students who learn to keyboard without proper instruction must often unlearn improper techniques," showed that almost all business education certified respondents (95.0%) had a positive reaction. Approximately three-fourths (73.9%) of the non-business education certified respondents reacted positively to this statement while 16.8% had no opinion (chi-square = 24.02, $p < .001$). This represented a low relationship (Cramer's $V = .29$) between teacher's area of certification and teacher's response.

Survey statement 31, "students who know how to touch type develop their composition skills faster than those who 'hunt and peck,'" found that 93.4% of the business education certified respondents had a positive reaction. Likewise, three-fourths (75.8%) of the non-business education certified respondents likewise reacted positively while 16.1% had no opinion about this statement (chi-square = 15.45, $p < .001$). This represented a low relationship (Cramer's $V = .23$) between teacher's area of certification and teacher's response.

Perceptions About the Qualifications of Keyboarding Instructors in the Pre-Secondary Curriculum

The perceptions of pre-secondary keyboarding respondents relative to survey statements 32 through 36 are summarized in Table 21. The complete raw data for the qualifications of keyboarding instructors in the pre-secondary curriculum appears in Appendix I.

Table 21. Pre-Secondary Keyboarding Instructors' Perceptions About the Qualifications of Keyboarding Instructors in the Pre-Secondary Curriculum by Teacher's Area of Certification.

Statement and Response	Business Education Certified (N = 121) %	Non-Business Education Certified (N = 161) %	Chi-square	Cramer's V
The State Should Require Special Certification to Teach Keyboarding to Pre-Secondary Students				
Negative	25.6	73.9	102.20***	.60
No Opinion	10.7	18.6		
Positive	63.6	7.5		
Pre-Secondary Teachers Should be Certified to Teach Keyboarding				
Negative	34.7	68.3	66.14***	.48
No Opinion	9.1	20.5		
Positive	56.2	11.2		
Teacher Education Programs Should Prepare Students to Teach Keyboarding				
Negative	15.7	13.7	6.82*	.15
No Opinion	9.1	20.5		
Positive	75.2	65.8		
Anyone Can Teach Keyboarding				
Negative	92.6	54.0	49.81***	.42
No Opinion	1.7	18.6		
Positive	5.8	27.3		

(continued on next page)

Table 21 (Continued)

Statement and Response	Business Education Certified (<u>N</u> = 121) %	Non-Business Education Certified (<u>N</u> = 161) %	Chi-square	Cramer's V
In-service Training for Pre-Secondary Teachers Would Provide Enough Expertise for Pre-Secondary Teachers to Teach Keyboarding				
Negative	86.0	13.0	151.82***	.73
No Opinion	5.8	12.4		
Positive	8.3	74.5		

* Significant .05

** Significant .01

*** Significant .001

Survey statement 32 was, "the state should require special certification to teach keyboarding to pre-secondary students." Almost two-thirds of the business education certified respondents (63.6%) commented positively while only 7.5% of the non-business education certified respondents expressed a positive reaction. On the other hand, 25.6% of the business education certified respondents commented negatively while almost three-fourths (73.9%) of the non-business education certified respondents reacted negatively (chi-square = 102.20, $p < .001$). This represents a substantial relationship (Cramer's $V = .60$) between teacher's area of certification and teacher's response.

In response to survey statement 33, "pre-secondary teachers should be certified to teach keyboarding," over one-half of the business education certified respondents (56.2%) provided a positive reaction. Only 11.2% of the non-business education certified respondents commented positively. Slightly over one-third of the business education certified respondents (34.7%) reacted negatively while over two-thirds of the non-business education certified respondents displayed a negative reaction (chi-square = 66.14, $p < .001$). This represents a moderate relationship (Cramer's $V = .48$) between teacher's area of certification and teacher's response.

When asked to respond to survey statement 34, "teacher education programs should prepare students to teach keyboarding," 75.8% of the business education certified and 65.8% of the non-business education certified respondents offered a positive reaction (chi-square = 6.82,

$p < .05$). This represents a low relationship (Cramer's $V = .15$) between teacher's area of certification and teacher's response.

The response to survey statement 35, "anyone can teach keyboarding," showed that almost all of the business education certified respondents (92.6%) had negative feelings toward this statement while only slightly over one-half of the non-business education respondents (54.0%) had a negative reaction. A little more than one-fourth of the non-business education certified respondents (27.3%) expressed positive feelings when responding to this statement ($\chi^2 = 49.81$, $p < .001$). This represents a moderate relationship (Cramer's $V = .42$) between teacher's area of certification and teacher's response.

Responses to survey statement 36, "inservice training for pre-secondary teachers would provide enough expertise for pre-secondary teachers to teach keyboarding," found that 86.0% of the business education certified respondents reacted negatively while 74.5% of the non-business education certified respondents reacted positively ($\chi^2 = 151.82$, $p < .001$). This represents a very strong relationship (Cramer's $V = .73$) between teacher's area of certification and teacher's response.

Chapter 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this chapter is to present the summary, conclusions, and recommendations of the study. The chapter includes a summarization of the purpose of the study, procedures, findings, conclusions and discussion, and recommendations for future research.

Purpose of the Study

The general purpose of this study was to describe the status of keyboarding instruction at the pre-secondary level in the public schools of Pennsylvania. The study focused on three major research questions:

1. What are the instructional practices of pre-secondary keyboarding instruction regarding:
 - a. grade level where keyboarding is being taught?
 - b. years of pre-secondary keyboarding teaching experience of instructors?
 - c. certification areas of pre-secondary keyboarding teachers?
 - d. number of pre-secondary keyboarding instructors receiving formal preparation through teacher education institutions?
 - e. formal and informal methods of preparation used by teachers who teach pre-secondary keyboarding?

- f. objectives of pre-secondary keyboarding programs?
 - g. kinds of equipment used to teach pre-secondary keyboarding?
 - h. teachers' knowledge about and personal use of the touch method of keyboarding?
 - i. instructional methods used for teaching pre-secondary keyboarding?
 - j. instructional materials used to teach pre-secondary keyboarding?
 - k. amount of time devoted to introducing keyboard keys?
 - l. student evaluation approaches used to assess keyboarding performance?
 - m. sequential offerings within the school district for continuous application of keyboarding skills?
2. What are the perceptions of pre-secondary keyboarding teachers regarding the:
- a. appropriateness of keyboarding in the pre-secondary curriculum?
 - b. value of developing keyboarding skills?
 - c. qualifications of instructors providing keyboarding instruction?
3. Do the perceptions of pre-secondary keyboarding teachers differ based on their area of certification regarding the:

- a. appropriateness of keyboarding in the pre-secondary curriculum?
- b. value of developing keyboarding skills?
- c. qualifications of instructors providing keyboarding instruction?

Procedures

The population for this study consisted of all of Pennsylvania's 501 public school districts. A letter was sent to the superintendent for each school district requesting him/her to forward the cover letter and survey instrument to an individual in the school district who was responsible for teaching any formal introductory keyboarding experience at the pre-secondary level (K-8).

The survey instrument, developed from a review of the literature, collected data pertaining to the three research questions. Studies conducted by Condon et al. (1989), Prigge (1988), and Sormunen et al. (1989) were used as a basis for the development of the survey instrument. Section I of the survey consisted of 19 questions that provided descriptive information about pre-secondary keyboarding teachers and their instructional practices. Section II consisted of 17 statements that measured teachers' perceptions related to various issues associated with pre-secondary keyboarding. Scoring of items for Section II was based on a Likert-type scale: strongly disagree (1), disagree (2), no opinion (3), agree (4), strongly agree (5). Because of the distribution of responses to the issue statements, in the data analysis the original five options were "collapsed" into

three categories: negative, no opinion, and positive. SPSS-X was the data analysis program used to analyze data. The primary statistics used were descriptive statistics of mean, percentage, and correlation, namely chi-square and Cramer's V. Cramer's V was used when both variables have a nominal scale and the table is an R by C table.

Findings, Conclusions, and Discussion

A total of 416 (83.0%) school districts responded to the survey, with 282 (67.8%) school districts indicating they currently offer a pre-secondary keyboarding program. Of the 282 teacher respondents, 121 were business education certified and 161 were non-business education certified.

Instructional Practices of Pre-Secondary Keyboarding Instructors

Grade Level Where Keyboarding is Taught. Eighty-five percent of the business education certified respondents indicated their school district offered an initial introductory pre-secondary keyboarding experience at the sixth through eighth grade levels. An approximately equal proportion of the 128 (79.5%) non-business education certified respondents taught their formal introductory experience in grades three through seven. A combined total of only 23 (8.2%) respondents indicated their school district offered an initial formal introductory keyboarding experience below the third grade.

The findings from this study indicated that a majority of school districts (91.8%) in Pennsylvania have initiated pre-secondary keyboarding programs, primarily between grades three through eight.

Research studies conducted by Behymer and Echternacht (1987) and Kaser (1984) found that students are physiologically more capable of developing keyboarding skills beginning at the third grade level. It appears that the majority of pre-secondary keyboarding programs in Pennsylvania's public schools are being implemented at the appropriate grade level -- commencing in the third grade or later.

Years of Experience and Certification Area. Nearly three-fourths (73.6%) of the business education certified respondents and 79.5% of the non-business education certified respondents had between one and five years experience teaching keyboarding at the pre-secondary level.

One hundred twenty-one (42.8%) of the respondents in this study, who currently teach pre-secondary keyboarding, were business education certified. Slightly less than one-third (31.1%) were elementary education certified while 9.8% were mathematics certified. The remaining 16.3% of the pre-secondary keyboarding respondents held certification/responsibility in any one of 15 other areas. Since certification for teaching keyboarding at the elementary level in Pennsylvania is non-existent, it is the responsibility of the local school district to assure that the instructor is adequately qualified.

Keyboarding Instruction in Teacher Education Program. Eighty percent of the business education certified respondents indicated their teacher education program provided formal instruction for teaching keyboarding/typewriting. Only 6 (3.7%) non-business education certified respondents reported receiving formal training to teach keyboarding/typewriting in their teacher preparation program.

Since no mandate exists in Pennsylvania for instructional use of computers (to include keyboarding) in schools, one might expect the finding in this study.

Type of Formal and Informal Preparation for Teaching Keyboarding.

Nearly all business education certified respondents (99.2%) indicated that they formally prepared themselves to teach keyboarding. A large number of the non-business education certified respondents (80.1%) also prepared themselves through formal means to instruct keyboarding. A majority of both business education certified respondents (93.4%) and non-business education certified respondents (55.3%) reported completing keyboarding/typewriting courses. An almost equal percentage of business education certified respondents (63.6%) and non-business education certified respondents reported completing word processing courses. However, a huge difference was reported in the number of business education certified respondents (90.9%) and non-business education certified respondents (13.0%) completing methods of teaching keyboarding/typewriting courses.

Independent study/reading was the method by which a combined total of 227 (80.5%) respondents informally prepared themselves to instruct keyboarding. Respondents listed a wide variety of other means in which they prepared themselves informally to instruct keyboarding.

The findings of this study indicated that 88.3% of the pre-secondary keyboarding respondents had prepared themselves by formal means to instruct keyboarding. Thirty-three respondents indicated that they have completed no formal method of preparation to

instruct keyboarding; however, 32 of these respondents have prepared themselves through informal means. It is obvious from the response to this survey that Pennsylvania's pre-secondary keyboarding teachers were making a concentrated effort to prepare themselves to instruct keyboarding.

Keyboarding Objectives. The majority of business education certified (87.6%) and non-business education certified respondents (70.8%) noted that forming good keyboarding habits was their specific objective in teaching keyboarding. As identified in the literature, the primary objective of any pre-secondary keyboarding course should be to have students develop good keyboarding habits (Dennee, 1989; Jackson & Berg, 1986). This study found that forming good keyboarding habits was the top priority of the majority of the keyboarding instructors (78.0%).

Equipment Used in Teaching. Nearly 90% of the survey respondents used microcomputers for keyboarding instruction. Almost 20% of the respondents in this study reported using electronic typewriters for instructional purposes and another 20% used electric typewriters. Only 5 (1.8%) respondents used manual typewriters. The practice in this state agreed with the research that keyboarding instruction should be conducted with the use of microcomputers, electric typewriters, and/or electronic typewriters (Kimball & Lane, 1989).

Touch Typing as a Teaching Strategy. All 121 (100%) business education certified respondents reported that they personally knew how to use the touch method of typing and in fact used the touch method for instructional purposes. Nearly all of the non-business education

certified respondents (94.4%) knew how to use the touch method, but slightly less (85.7%) taught the touch method to their students.

Twenty-three (14.3%) non-business education certified respondents were teaching keyboarding by a means other than the touch method. Any alternative method, which generally is referred to as the hunt-and-peck method, might produce temporary proficiency; however, this method is viewed as incorrect and it leads to high levels of frustration. With the escalating number of computers present in our nation's schools, students must learn the proper mechanics of keyboarding so they might use this learning tool more efficiently.

Method of Instruction. A majority of the business education certified respondents (58.7%) used the teacher-directed method as their primary means of teaching keyboarding; whereas, 45.3% of the non-business education certified respondents used the computer-directed method. Thirty-five percent of the business education certified respondents and 45% of the non-business education certified respondents used a combination of the teacher-directed and computer-directed methods as their primary means of teaching keyboarding.

A review of the literature failed to reveal any studies conducted to determine the effectiveness of the computer-assisted method of teaching keyboarding. Regardless of the method of instruction, Robinson (1985) recommended that the following elements prevail in keyboarding instruction: modeling, reinforcement, individualized goal setting, pacing, differentiated practice, and evaluation. He warned that computer-assisted instruction has its limitations and a well-trained teacher must be available to supply the missing ingredients.

Instructional Materials. Nearly two-fifths (39.4%) of the respondents reported using textbooks for keyboarding instruction. Approximately 80% of the respondents said they used computer software programs for instruction. A total of 35% of the respondents used teacher-made materials for instructional purposes.

The most frequently used textbooks were published by South-Western Publishing Company and MacMillan/McGraw Hill Book Company. The software packages most frequently used by respondents included: Minnesota Educational Computer Consortium (MECC), Microtype: The Wonderful World of PAWS, and Typing Tutor.

Approximately the same number of respondents in this study and Kimball and Lane's (1989) study used textbooks for instructional purposes. The findings of this study indicated a large number of the total respondents (79.4%) used computer software packages; whereas, Kimball and Lane (1989) in their national survey of pre-secondary keyboarding instructors found that only 42% used this instructional material. The software packages most frequently used by respondents in this study were the same ones reported in the Kimball and Lane (1989) national study.

Length of Instruction. The response to the number of sessions to introduce keyboard keys was equally distributed. Approximately 25% of the combined respondents used 10 or fewer sessions, 35% used from 11 to 20 sessions, and 31% used from 21 to 30 sessions.

Nearly 74% of the respondents reported that their class sessions lasted between 31 and 45 minutes. This finding is in line with the research that recommends pre-secondary keyboarding lessons should last

from 30 to 45 minutes, depending on the grade level of the student (Dennee, 1989; Frankeberger, 1985; Headley, 1983; Hedley, 1985, Jackson & Berg, 1986; Kimball & Lane, 1989; Milkes, 1987).

Numerous respondents to this study personally commented that the length of class sessions and total number of class periods devoted to keyboarding instruction was affected by computer availability. Sormunen (1988) concluded that 15 or less hours of instruction was an inadequate amount of time to develop an efficient keyboarding skill.

Evaluation. Approximately 90% of the business education certified respondents indicated they formally evaluated performance in keyboarding while considerably less of the non-business education certified respondents (48.4%) reported using some formal means of evaluation. The combined results revealed that 41.8% of the respondents grade students based on techniques, 34.4% grade on speed and accuracy levels, and 16.3% used the pass/fail system of evaluation.

In many cases, respondents in this study indicated they evaluated performance by more than one criterion. As the research suggested, and this study confirmed, the emphasis on evaluation at the pre-secondary level should be placed on developing proper keyboarding techniques. A strong foundation is essential in developing the keyboarding skill (Kimball & Lane, 1989).

Sequential Exposure to Instruction. One hundred forty-nine (52.8%) respondents indicated their school district had a formal plan for developing keyboarding skills through the pre-secondary grades. Nearly one-half (46.8%) of the combined respondents indicated their

school district plans to develop keyboarding skills through word processing applications. Twenty-seven percent of the respondents reported that their school district plans to develop keyboarding skills through language arts and 21.3% of the school districts planned to use programming applications.

Keyboarding is a cumulative skill that dictates ample sessions be provided for mass practice (Hedley, 1985). In future months and years, an adequate amount of time should be provided to reinforce this skill (Jackson & Berg, 1986). Sowers (1989) warned that if reinforcement activities are not provided, the level of the student's proficiency might diminish to the point where it is no longer a usable skill.

Perceptions of Pre-Secondary Keyboarding Instructors

Perceptions Regarding Appropriateness of Keyboarding in the Pre-Secondary Curriculum. A large majority of the business education certified respondents (95.0%) and non-business education certified respondents (94.4%) felt that keyboarding should be taught at the pre-secondary level. Behymer and Echternacht (1987) and Kaser (1984) found that students beginning at the third grade level are physiologically more capable of learning keyboarding because they have longer attention spans, better dexterity, a greater maturity, and adequate reading skills.

Over 70% of the business education certified respondents felt students should be taught keyboarding skills before they were allowed to use computers; however, only 21.1% of the non-business education

certified respondents had a positive reaction ($\chi^2 = 76.43$, $p < .001$). Hoot (1986) rationalized that increased typing facility contributes to improved computer facility needs to be considered in deciding whether keyboarding skills are a prerequisite for using computers.

Eighty-one percent of the business education certified respondents and 68.3% of the non-business education certified respondents perceived that there is not enough time in the school day to offer keyboarding in the pre-secondary curriculum ($\chi^2 = 6.72$, $p < .05$). This finding indicated that respondents to this study felt time is available in the pre-secondary curriculum for keyboarding instruction.

Nearly all of the business education certified respondents (95.9%) felt that it is preferable to have a business educator teach keyboarding at the pre-secondary level while only 16.1% of the non-business education certified respondents reacted with a positive answer ($\chi^2 = 176.79$, $p < .001$). This is not an unusual response considering the territorial nature of the keyboarding issue. Loughran (1986) emphatically stated that business educators should teach keyboarding, while Wetzel (1985) suggested that regular classroom teachers should instruct elementary keyboarding based on a premise that they can be as effective.

Approximately the same proportion of business education certified respondents (47.1%) and non-business education certified respondents (44.1%) reacted negatively to having pre-secondary teachers and business educators team teach keyboarding at the pre-secondary level

(chi-square = 6.31, $p < .05$). If practical, Diehl (1986) suggested that elementary keyboarding instructors be given an hour of release time daily for two weeks to observe the psychology and appropriate methods utilized by experienced business educators to introduce the keyboard.

Almost all of the business education certified respondents (95.9%) disagreed that students can learn to keyboard by themselves. Considerably less of the non-business education certified respondents (68.9%) reacted with a negative answer (chi-square = 31.99, $p < .001$). Considering the complex elements involved in learning a psychomotor skill, it is questionable whether young learners can accomplish this feat by themselves (Robinson, 1985).

Three-fourths of the business education certified respondents perceived that keyboarding should be offered as a self-contained course, but only 36% of the non-business education certified respondents agreed (chi-square = 41.06, $p < .001$). Since more flexibility exists in the junior high/middle school curriculum and the majority of business education certified respondents to this study (65.3%) teach keyboarding at the seventh and eighth grade level, this finding is consistent. Likewise, the majority of non-business education certified respondents (65.8%) offered an initial, formal introductory experience in keyboarding between the third and sixth grade level, where a more structured curriculum exists.

Perceptions About the Value of Developing Keyboarding Skills in the Pre-Secondary Curriculum. Nearly all of the business education certified respondents (99.2%) and a large majority of the non-business

education certified respondents (89.4%) felt that students should be required to develop keyboarding skills (chi-square = 11.09, $p < .01$). Keyboarding is an extremely valuable skill, and obtaining a sound fundamental background is essential in today's highly technological society (Wetzel, 1985). The Policies Commission on Business and Economic Education (1984) documented that students with keyboarding skills are better able to interface with computers.

Approximately 94% of the business education certified respondents and 82% of the non-business education certified respondents perceived that keyboarding is a basic literacy skill (chi-square = 10.08, $p < .01$). This finding agreed with Loughran's (1986) comments that keyboarding skills have become a basic need since computers are rapidly infiltrating the home, school, and workplace.

Over 92% of the business education certified respondents felt that the development of touch keyboarding operations is necessary for efficient operation of a computer while only 62.1% of the non-business education certified respondents agreed (chi-square = 36.52, $p < .001$). A research study conducted by Jackson and Berg (1986) documented that any method of keyboarding other than by the touch method is inefficient.

Almost all of the business education certified respondents (95.0%) and almost 74% of the non-business education certified respondents felt that students who learn to keyboard without proper instruction must often unlearn improper techniques (chi-square = 24.02, $p < .001$). Hoggatt et al. (1988) stated that it is easier to form good habits than to break bad habits.

A large majority of the business education certified respondents (93.4%) and over three-fourths (75.8%) of the non-business education certified respondents agreed that students who know how to touch type develop their composition skills faster than those who hunt and peck (chi-square = 15.45, $p < .001$). Brady (1984) and Hopping (1984) suggested that the hunt and peck method is time-consuming and students become frustrated in their assignments.

Perceptions About the Qualifications of Keyboarding Instructors in the Pre-Secondary Curriculum. Almost two-thirds (63.6%) of the business education certified respondents indicated that the state should require special certification to teach keyboarding to pre-secondary students while 73.9% of the non-business educators certified respondents disagreed with the statement (chi-square = 102.20, $p < .001$). When asked whether pre-secondary teachers should be certified to teach keyboarding, 56.2% of the business education certified respondents offered a positive reply while over two-thirds (68.3%) of the non-business education certified respondents reacted negatively (chi-square = 66.14, $p < .001$).

Over three-fourths (75.8%) of the business education certified respondents and nearly two-thirds (65.8%) of the non-business education certified respondents felt that teacher education programs should prepare future teachers to teach pre-secondary keyboarding (chi-square = 6.82, $p < .05$). Sormunen et al. (1989) suggested that it is imperative for teacher education programs to offer training in the use of computers, to include keyboarding, since computers have become an important part of the classroom learning experience.

When asked whether anyone can teach keyboarding, nearly 93% of the business education certified respondents indicated a negative reaction while considerably less of the non-business education certified respondents (54.0%) reacted negatively (chi-square = 49.81, $p < .001$). The respondents to this study agreed that not everyone can teach keyboarding. Rhodes (1987) suggested that pre-secondary keyboarding instructors have received training in the traits and interests of the student age group and possess a minimal degree of computer awareness, to include a functional touch keyboarding skill.

The large majority of business education certified respondents (86.0%) reacted negatively when asked if inservice training for pre-secondary teachers would provide enough expertise for pre-secondary teachers to teach keyboarding while nearly three-fourths (74.5%) of the non-business education certified respondents offered a positive reply (chi-square = 151.82 $p < .001$). This response revealed that a strong disagreement exists between business education certified and non-business education certified respondents concerning the adequacy of inservice training for preparing teachers to teach keyboarding. Condialdi (1985) suggested that inservice sessions seem to be the most appropriate means of training for elementary keyboarding instructors. Williams (1988) emphasized that regardless of the inservice program utilized for the preparation of pre-secondary keyboarding instructors, the program should last long enough to assure thorough preparation.

Recommendations

Based on the findings of this study, it is recommended that:

1. Local school districts should assure that keyboarding instructors possess the skills and abilities related to this responsibility in light of the fact that very few non-business education certified respondents to this study received formal training to teach keyboarding in their teacher preparation program. The increased use of computers in the pre-secondary curriculum requires the assurance that keyboarding instructors are knowledgeable about teaching the techniques of a psychomotor skill.

2. Teacher training institutions should provide formal training for future teachers in using computer technology in the classroom. This training should include a methods unit/course for teaching keyboarding. Keyboarding instructors need to be able to operate a computer, demonstrate the correct keyboarding techniques, establish student goals, provide reinforcement activities, offer critical feedback and evaluation, and possess an understanding of child psychology.

3. Local school districts and universities/colleges should collaborate to provide instructional workshops and/or inservice training sessions to individuals who are currently teaching pre-secondary keyboarding. Such instruction might include formal keyboarding/typewriting, methods of instruction, and/or word processing content.

4. School administrators, business education certified teachers, and non-business education certified pre-secondary keyboarding instructors should work cooperatively in developing/maintaining effective keyboarding programs. Each of these three groups can provide expertise in their specialized area to assure the development of a quality keyboarding program.

Recommendations for Future Research

Based on the findings and conclusions of this study, the following recommendations for future research are proposed:

1. Development of a model pre-secondary keyboarding curriculum that could be implemented at any grade level.
2. Measure the achievement level of students completing keyboarding at various grades.
3. Measure the achievement level of students taught keyboarding by business education certified teachers versus students taught by non-business education certified teachers and those taught by the teacher-directed method versus those taught by the computer-assisted method.
4. Evaluate software packages and develop a listing of advantages and disadvantages regarding their capabilities, effectiveness, and limitations.
5. Survey Pennsylvania teacher training institutions to determine if they offer education in computer technology and the learning theory of teaching keyboarding.

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Appendix A
LETTER TO SUPERINTENDENT

CARLISLE AREA SCHOOL DISTRICT

623 WEST PENN STREET
CARLISLE, PA 17013
Tel. 717-240-6800

ROBERT T. STOWELL, Superintendent

October 1, 1990

Dear Superintendent:

I am seeking your assistance as I conduct a study related to keyboarding. The data I collect should provide useful information to the school districts of Pennsylvania.

This study is designed to determine the status of keyboarding at the pre-secondary (K-8) level in the State of Pennsylvania. In order to accomplish this goal, I would appreciate your forwarding the enclosed cover letter and survey instrument to an individual in your school district who is responsible for teaching any formal (organized, scheduled instruction) introductory pre-secondary keyboarding experience.

If such a program does not exist in your school district, kindly mark NONE across the front of the survey instrument and return it to me in the self-addressed envelope. For tabulation purposes, please be sure to identify the name of your school district on the last page of the survey form and return it to me by October 31, 1990.

Please note that keyboarding need not be a self-contained course. Actually, in most cases at the pre-secondary level, keyboarding is a small unit of a computer literacy program.

The information provided in this study will be confidential. Neither the school nor the teacher will be identified in the results of this study. If you have any questions or concerns, please contact me at 717-240-6870 (work) or 717-249-6780 (home).

Your cooperation is greatly appreciated.

Sincerely,

John Cantalupi, Coordinator
Business Education Department

Enclosures

Appendix B

LETTER TO KEYBOARDING INSTRUCTOR

CARLISLE AREA SCHOOL DISTRICT

623 WEST PENN STREET
CARLISLE, PA 17013
Tel. 717-240-6800

ROBERT T. STOWELL, Superintendent

October 1, 1990

Dear Instructor:

I am seeking your assistance as I conduct a study related to keyboarding. The data I collect should provide useful information to the school districts of Pennsylvania.

You have been identified as an instructor in your school district who offers an introductory experience in pre-secondary (K-8) keyboarding. This research study is designed to determine the status of keyboarding at the pre-secondary level in the State of Pennsylvania. Please note that keyboarding need not be a self-contained course. Actually, in most cases at the pre-secondary level, keyboarding is a small unit of a computer literacy program.

Kindly complete the enclosed survey instrument and return it to me in the self-addressed envelope by October 30, 1990.

The information provided in this study will be confidential and your participation is voluntary. Neither you nor the school district will be individually identified in the results of this study. If you have any questions or concerns, please contact me at 717-240-6870 (work) or 717-249-6780 (home).

Your cooperation is greatly appreciated.

Sincerely,

John Cantalupi, Coordinator
Business Education Department

Enclosure

Appendix C
SURVEY INSTRUMENT

ASSESSMENT OF PRE-SECONDARY KEYBOARDING
IN PENNSYLVANIA PUBLIC SCHOOLS

SECTION I -- Keyboarding Instructional Practices

Keyboarding is the act of placing information into various types of equipment through the use of a typewriter-like keyboard.

1. At what pre-secondary grade level do you formally teach keyboarding? Check all that apply.
☐ K ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8
2. How many years have you taught pre-secondary keyboarding? Include current year.
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ more than 8
3. Are you a certified business education teacher? ☐ Yes ☐ No
4. If you are not a certified business education teacher, what is your area of certification?

5. Did your college teacher education program offer formal instruction for teaching keyboarding?
☐ Yes
☐ No
6. What formal preparation have you had for teaching keyboarding? Check all that apply.
☐ None
☐ Keyboarding/typewriting course(s)
☐ Methods of teaching keyboarding/typewriting course(s)
☐ Word processing course(s)
7. How have you informally prepared yourself to instruct keyboarding? Check all that apply.
☐ Independent study/reading
☐ Help from business education teachers
☐ Help from teachers other than business educators
☐ Inservice training sessions
☐ ☐ University sponsored ☐ School district sponsored
☐ Workshop/seminar
☐ Other. Please specify. _____

Touch typing is having eight fingers positioned on the home row keys (asdfjkl;) and activating all other keys by using the proper reach from home row with the proper finger with little need to look at the keyboard.

8. Do you know how to use the touch method of keyboarding/typewriting? ☐ Yes ☐ No
9. Do you teach the touch method of keyboarding/typewriting to your students? ☐ Yes ☐ No
10. What kinds of equipment do you use to teach keyboarding? Check all that apply.
☐ Microcomputers ☐ Electronic typewriters ☐ Electric typewriters
☐ Manual typewriters ☐ Other. Please explain. _____

Teacher directed instruction consists of an instructor who guides the learning and pacing of students through drills during each class period, with all students at the same point.

Computer directed instruction consists of using software compatible with computers. This is a self-tutorial style.

11. What is the primary method of instruction that you use?
☐ Teacher directed ☐ Computer directed ☐ Combination
☐ Other. Please specify. _____
12. What instructional materials do you use to teach keyboarding? Check all that apply and indicate materials used.
☐ Computer software program(s). Provide names. _____
☐ Textbook(s). Provide names. _____
☐ Teacher-made material(s). Indicate types. _____
☐ Other. Please specify. _____
13. Do you have stated, specific student objectives for teaching keyboarding?
☐ Yes ☐ No (skip question 14 and go to question 15)
14. If yes, which of the following are included? Check all that apply.
☐ To form good keyboarding habits
☐ To use time at the microcomputer/typewriter more efficiently
☐ To develop a minimum speed and accuracy rate
☐ To develop language arts skills
☐ Other. Please specify. _____
15. After the alphabetic keys are presented, does your school have a formal plan for developing keyboarding skills throughout the pre-secondary grades?
☐ Yes ☐ No (skip question 16 and go to question 17)
16. If yes, what types of applications are used? Check all that apply.
☐ Language Arts ☐ Programming ☐ Math
☐ Social Studies ☐ Word Processing ☐ Science
☐ Other. Please specify. _____
17. How do you evaluate performance in keyboarding? Check all that apply.
☐ No formal evaluation is used
☐ Grades based on speed and accuracy
☐ Grades based on techniques
☐ Pass/fail
☐ Other. Please explain. _____
18. How many class sessions are devoted to introducing the keyboard keys?
☐ 10 or fewer ☐ 11-15 ☐ 16-20 ☐ 21-25
☐ 26-30 ☐ Other. Please specify. _____
19. On the average, how long are class sessions (in minutes)?
☐ less than 10 ☐ 11-15 ☐ 16-20 ☐ 21-25 ☐ 26-30
☐ 31-35 ☐ 36-40 ☐ 41-45 ☐ 46-50 ☐ more than 50

BEST COPY AVAILABLE

SECTION II -- Opinions on Keyboarding Issues

Circle the choice which best describes your position.

SD = Strongly Disagree	D = Disagree	N = No Opinion	A = Agree	SA = Strongly Agree	
20. Keyboarding should be taught at the pre-secondary level.	SD	D	N	A	SA
21. Students should be taught keyboarding skills before they are allowed to use computers.	SD	D	N	A	SA
22. There is not enough time in the day to offer keyboarding in the pre-secondary curriculum.	SD	D	N	A	SA
23. It is preferable to have a business educator teach keyboarding at the pre-secondary level.	SD	D	N	A	SA
24. Pre-secondary teachers and business educators should team teach keyboarding at the pre-secondary level.	SD	D	N	A	SA
25. Students can learn to keyboard by themselves.	SD	D	N	A	SA
26. Keyboarding should be a self-contained course.	SD	D	N	A	SA
27. Students should be required to develop keyboarding skills.	SD	D	N	A	SA
28. Keyboarding is a basic literacy skill.	SD	D	N	A	SA
29. The development of touch keyboarding operations is necessary for efficient operation of a computer.	SD	D	N	A	SA
30. Students who learn to keyboard without proper instruction must often unlearn improper techniques.	SD	D	N	A	SA
31. Students who know how to touch type develop their composition skills faster than those who "hunt and peck."	SD	D	N	A	SA
32. The state should require special certification to teach keyboarding to pre-secondary students.	SD	D	N	A	SA
33. Pre-secondary teachers should be certified to teach keyboarding.	SD	D	N	A	SA
34. Teacher education programs should prepare students to teach keyboarding.	SD	D	N	A	SA
35. Anyone can teach keyboarding.	SD	D	N	A	SA
36. In-service training for pre-secondary teachers would provide enough expertise for pre-secondary teachers to teach keyboarding.	SD	D	N	A	SA

NAME OF SCHOOL DISTRICT _____

Appendix D

USE OF HUMAN SUBJECTS IN RESEARCH APPROVAL FORM

PENNSTATE



Senior Vice President for Research and
Dean of the Graduate School
Office for the Protection of Human Subjects

(814) 865-1775

115 Kern Graduate Building
The Pennsylvania State University
University Park, PA 16802

Date: March 12, 1990

From: R. J. Bord, Director *RJB*

To: John D. Cantalupi - c/o Kenneth C. Gray

Subject: Proposal for Use of Human Subjects in Research - Exemption
"Measurement of the Keyboarding Speed of Junior/Middle High School
Students Who Have Been Taught Keyboarding by a Certified Business
Education Teacher Versus Those Taught by a Non-Certified Business
Education Teacher"

I have examined your proposal for use of human subjects in your research. Subjects in your research are at minimal risk. You may proceed with your study.

By accepting this decision you agree to notify this office of (1) any additions or changes in procedures for your study that modify the subjects' risks in any way and (2) any events that affect the safety or well-being of subjects.

RJB/kje

cc: K. C. Gray
F. G. Welch
V. N. Lunetta

Appendix E

FOLLOW-UP LETTER TO SUPERINTENDENT

CARLISLE AREA SCHOOL DISTRICT

623 WEST PENN STREET
CARLISLE, PA 17013
Tel. 717-240-6800

ROBERT T. STOWELL, Superintendent

November 1, 1990

Dear Superintendent:

Several weeks ago I contacted you concerning a study I am conducting to determine the status of pre-secondary (K-8) keyboarding in the State of Pennsylvania. According to my records, I am still awaiting your reply.

I would appreciate your forwarding the enclosed cover letter and survey instrument to an individual in your school district who is responsible for teaching any formal (organized, scheduled instruction) introductory pre-secondary keyboarding experience.

If such a program does not exist in your school district, kindly mark NONE across the front of the survey instrument and return it to me in the self-addressed envelope. For tabulation purposes, please be sure to identify the name of your school district on the last page of the survey form and return it to me by November 30, 1990.

Please note that keyboarding need not be a self-contained course. Actually, in most cases at the pre-secondary level, keyboarding is a small unit of a computer literacy program.

The information provided in this study will be confidential. Neither the school nor the teacher will be identified in the results of this study. If you have any questions or concerns, please contact me at 717-240-6870 (work) or 717-249-6780 (home).

Your cooperation will be greatly appreciated.

Sincerely,

John Cantalupi, Coordinator
Business Education Department

Enclosures

Appendix F

FOLLOW-UP LETTER TO KEYBOARDING INSTRUCTOR

CARLISLE AREA SCHOOL DISTRICT

623 WEST PENN STREET
CARLISLE, PA 17013
Tel. 717-240-6800

ROBERT T. STOWELL, Superintendent

November 1, 1990

Dear Instructor:

I am seeking your assistance as I conduct a study related to keyboarding. The data I collect should provide useful information to the school districts of Pennsylvania.

You have been identified as an instructor in your school district who offers an introductory experience in pre-secondary (K-8) keyboarding. This research study is designed to determine the status of keyboarding at the pre-secondary level in the State of Pennsylvania. Please note that keyboarding need not be a self-contained course. Actually, in most cases at the pre-secondary level, keyboarding is a small unit of a computer literacy program.

Kindly complete the enclosed survey instrument and return it to me in the self-addressed envelope by November 30, 1990.

The information provided in this study will be confidential and your participation is voluntary. Neither you nor the school district will be individually identified in the results of this study. If you have any questions or concerns, please contact me at 717-240-6870 (work) or 717-249-6780 (home).

Your cooperation is greatly appreciated.

Sincerely,

John Cantalupi, Coordinator
Business Education Department

Enclosure

Appendix G

PRE-SECONDARY KEYBOARDING INSTRUCTORS'
PERCEPTIONS ABOUT APPROPRIATENESS OF KEYBOARDING
IN THE PRE-SECONDARY CURRICULUM BY TEACHERS
AREA OF CERTIFICATION

Table 22. Pre-Secondary Keyboarding Instructors' Perceptions About Appropriateness of Keyboarding in the Pre-Secondary Curriculum by Teacher's Area of Certification.

Statement	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
	$\frac{N}{\%}$	$\frac{N}{\%}$	$\frac{N}{\%}$	$\frac{N}{\%}$	$\frac{N}{\%}$
20. Keyboarding Should be Taught at the Pre-Secondary Level					
Business Education Certified	1 .8	4 3.3	1 .8	33 27.3	82 67.8
Non-Business Education Certified	3 1.9	4 2.5	2 1.2	47 29.2	105 65.2
Combined	4 1.4	8 2.8	3 1.1	80 28.4	187 66.3
21. Students Should be Taught Keyboarding Skills Before They are Allowed to use Computers					
Business Education Certified	4 3.3	21 17.4	10 8.3	30 24.8	56 46.3
Non-Business Education Certified	52 32.3	63 39.1	12 7.5	22 13.7	12 7.5
Combined	56 19.9	84 29.8	22 7.8	52 18.4	68 24.1
22. There is not Enough Time in the Day to Offer Keyboarding in the Pre-Secondary Curriculum					
Business Education Certified	56 46.3	43 35.5	7 5.8	13 10.7	2 1.7
Non-Business Education Certified	27 16.8	83 51.6	19 11.8	22 13.7	10 6.2
Combined	83 29.4	126 44.7	26 9.2	35 12.4	12 4.3

Table 22 (Continued)

Statement	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
	$\frac{N}{\%}$	$\frac{N}{\%}$	$\frac{N}{\%}$	$\frac{N}{\%}$	$\frac{N}{\%}$
23. It is Preferable to have a Business Educator Teach Keyboarding at the Pre-Secondary Level					
Business Education Certified	0 .0	1 .8	4 3.3	12 9.9	104 86.0
Non-Business Education Certified	44 27.3	60 37.3	31 19.3	19 11.8	7 4.3
Combined	44 15.6	61 21.6	35 12.4	31 11.0	111 39.4
24. Pre-Secondary Teachers and Business Educators Should Team Teach Keyboarding at the Pre-Secondary Level					
Business Education Certified	22 18.2	35 28.9	16 13.2	28 23.1	20 16.5
Non-Business Education Certified	19 11.8	52 32.3	40 24.8	43 26.7	7 4.3
Combined	41 14.5	87 30.9	56 19.9	71 25.2	27 9.6
25. Students Can Learn to Keyboard by Themselves					
Business Education Certified	72 59.5	44 36.4	1 .8	3 2.5	1 .8
Non-Business Education Certified	29 18.0	82 50.9	16 9.9	32 19.9	2 1.2
Combined	101 35.8	126 44.7	17 6.0	35 12.4	3 1.1

Table 22 (Continued)

Statement	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
	$\frac{N}{\%}$	$\frac{N}{\%}$	$\frac{N}{\%}$	$\frac{N}{\%}$	$\frac{N}{\%}$
26. Keyboarding Should be a Self-Contained Course					
Business Education Certified	3 2.5	16 13.2	13 10.7	48 39.7	41 33.9
Non-Business Education Certified	14 8.7	36 39.1	26 16.1	49 30.4	9 5.6
Combined	17 6.0	79 28.0	39 13.8	97 34.4	50 17.7

Appendix H

PRE-SECONDARY KEYBOARDING INSTRUCTORS'
PERCEPTIONS ABOUT THE VALUE OF DEVELOPING
KEYBOARDING SKILLS IN THE PRE-SECONDARY CURRICULUM
BY TEACHER'S AREA OF CERTIFICATION

Table 23. Pre-Secondary Keyboarding Instructors' Perceptions About the Value of Developing Keyboarding Skills in the Pre-Secondary Curriculum by Teacher's Area of Certification.

Statement	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
	$\frac{N}{\%}$	$\frac{N}{\%}$	$\frac{N}{\%}$	$\frac{N}{\%}$	$\frac{N}{\%}$
27. Students Should be Required to Develop Keyboarding Skills					
Business Education Certified	0 .0	1 .8	0 .0	30 24.8	90 74.4
Non-Business Education Certified	1 .6	9 5.6	7 4.3	93 47.8	51 31.7
Combined	1 .4	10 3.5	7 2.5	123 43.6	141 50.0
28. Keyboarding is a basic Literacy Skill					
Business Education Certified	0 .0	3 2.5	5 4.1	43 35.5	70 57.9
Non-Business Education Certified	2 1.2	18 11.2	10 6.2	93 57.8	38 23.6
Combined	2 .7	21 7.4	15 5.3	136 48.2	108 38.3
29. The Development of Touch Keyboarding Operations is Necessary for Efficient Operation of a Computer					
Business Education Certified	1 .8	3 2.5	5 4.1	39 32.2	73 60.3
Non-Business Education Certified	9 5.6	39 24.2	13 8.1	72 44.7	28 17.4
Combined	10 3.5	42 14.9	18 6.4	111 39.4	101 35.8

Table 23 (Continued)

Statement	Strongly		No		Strongly
	Disagree	Disagree	Opinion	Agree	Agree
	N %	N %	N %	N %	N %
30. Students Who Learn to Keyboard Without Proper Instruction must often Unlearn Improper Techniques					
Business Education Certified	3 2.5	2 1.7	1 .8	29 24.0	86 71.1
Non-Business Education Certified	2 1.2	13 8.1	27 16.8	83 51.6	36 22.4
Combined	5 1.8	15 5.3	28 9.9	112 39.7	122 43.3
31. Students Who know how to Touch Type Develop Their Composition Skills Faster than Those who "Hunt and Peck"					
Business Education Certified	0 .0	3 2.5	5 4.1	25 20.7	88 72.7
Non-Business Education Certified	3 1.9	10 6.2	26 16.1	78 48.4	44 27.3
Combined	3 1.1	13 4.6	31 11.0	103 36.5	132 46.8

Appendix I

PRE-SECONDARY KEYBOARDING INSTRUCTORS'
PERCEPTIONS ABOUT THE QUALIFICATIONS OF
KEYBOARDING INSTRUCTORS IN THE PRE-SECONDARY
CURRICULUM BY TEACHER'S AREA OF CERTIFICATION

Table 24. Pre-Secondary Keyboarding Instructors' Perceptions About the Qualifications of Keyboarding Instructors in the Pre-Secondary Curriculum by Teacher's Area of Certification.

Statement	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
	$\frac{N}{\%}$	$\frac{N}{\%}$	$\frac{N}{\%}$	$\frac{N}{\%}$	$\frac{N}{\%}$
32. The State Should Require Special Certification to Teach Keyboarding to Pre-Secondary Students					
Business Education Certified	9 7.4	22 18.2	13 10.7	28 23.1	49 40.5
Non-Business Education Certified	40 24.8	79 49.1	30 18.6	9 5.6	3 1.9
Combined	49 17.4	101 35.8	43 15.2	37 13.1	52 18.4
33. Pre-Secondary Teachers Should be Certified to Teach Keyboarding					
Business Education Certified	20 16.5	22 18.2	11 9.1	28 23.1	40 33.1
Non-Business Education Certified	38 23.6	72 44.7	33 20.5	16 9.9	2 1.2
Combined	58 20.6	94 33.3	44 15.6	44 15.6	42 14.9
34. Teacher Education Programs Should Prepare Students to Teach Keyboarding					
Business Education Certified	8 6.6	11 9.1	11 9.1	50 41.3	41 33.9
Non-Business Education Certified	5 3.1	17 10.6	33 20.5	87 54.0	19 11.8
Combined	13 4.6	28 9.9	44 15.6	137 48.6	60 21.3

Table 24 (Continued)

Statement	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
	N %	N %	N %	N %	N %
35. Anyone can Teach Keyboarding					
Business Education Certified	93 76.9	19 15.7	2 1.7	5 4.1	2 1.7
Non-Business Education Certified	16 9.9	71 44.1	30 18.6	39 24.2	5 3.1
Combined	109 38.7	90 31.9	32 11.3	44 15.6	7 2.5
36. In-service Training for Pre-Secondary Teachers Would Provide Enough Expertise for Pre-Secondary Teachers to Teach Keyboarding					
Business Education Certified	59 48.8	45 37.2	7 5.8	10 8.3	0 .0
Non-Business Education Certified	1 .6	20 12.4	20 12.4	101 62.7	19 11.8
Combined	60 21.3	65 23.0	27 9.6	111 39.4	19 6.7

VITA

John D. Cantalupi was born in Carlisle, Pennsylvania, on July 5, 1947. He graduated from Carlisle High School in 1965. He matriculated at Harrisburg Area Community College in January, 1966. After serving three years of active duty with the U.S. Army, he returned to Harrisburg Area Community College in 1969. He earned his Associate of Science Degree in 1970. He transferred to Shippensburg University of Pennsylvania where he earned his Bachelor of Science Degree in 1972. In 1973, working as a graduate assistant, he earned a Master of Education Degree from Shippensburg University.

Mr. Cantalupi began his teaching career in the Business Education Department at Carlisle High School in 1973. In 1987, he was promoted to his current position as Coordinator of the Business Education Department. In 1987, he entered The Pennsylvania State University to complete requirements for the Supervisor of Comprehensive Vocational Education Certificate (1988), Director of Comprehensive Vocational Education Certificate (1989), and Doctor of Education in Vocational Education.

Mr. Cantalupi published an article in the April, 1980, issue of The Balance Sheet entitled, "A Newsletter: Another Method of Promoting Your Business Education Department." In November, 1988, he published an article in the Business Education Forum entitled, "Conducting a Survey of Local Business Community." In April, 1991, he published an article in the Pennsylvania Schoolmaster entitled, "Community Effort Upgrades Business Education."

Mr. Cantalupi is a member of the National Association of Secondary School Principals, Pennsylvania Association of Secondary School Principals, National Business Education Association, Pennsylvania Business Education Association, and Omicron Tau Theta.